123-5-84

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1887.

No. 82.

JAMES P. CRAWFORD, APPELLANT,

vs.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, AND J. LOREN HEYSINGER, TRADING AS THE PHILADELPHIA NOVELTY MANUFACTURING COMPANY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF PENNSYLVANIA.

FILED OCTOBER 10, 1884.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1887.

No. 82.

JAMES P. CRAWFORD, APPELLANT,

vs.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, AND J. LOREN HEYSINGER, TRADING AS THE PHILADELPHIA NOVELTY MANUFACTURING COMPANY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF PENNSYLVANIA.

INDEX.

	Original.	Print.
Bill of complaint	2	1
Answer	9	5
Replication	16	9
Amendment to bill	18	10
Complainant's testimony	20	11
Deposition of Isaac W. Heysinger	21	11
Henry R. Heyl	26	15
Complainant's Exhibit—Reissue letters patent No. 9803	44	27
Copy of assignment of Henry R. Heyl to George W. Heyl	49	30
Copy of assignment of George W. Heyl to Isaac W. Heysinger	50	30
License	54	32
Respondents' testimony	59	34
Deposition of William J. Brown, Jr.	60	35
James P. Crawford	98	59
Respondents' Exhibit No. 3—File wrapper and contents in matter of reissue letters patent No. 9803	101	61
No. 1—Heyl's original patent No. 195,603	131	81
No. 4—D. M. Smyth, patent No. 41180	133	82

JUDD & DETWEILER, PRINTERS, WASHINGTON, SEPTEMBER 19, 1887.

	Original.	Print.
Respondents' Exhibit No. 5—A. C. Betts, patent No. 56884	134	82
No. 6—J. Tomlinson, patent No. 132,221	137	84
No. 7—G. W. McGill, patent No. 67665	139	86
No. 8—Esser and Steere, patent No. 78079	141	87
No. 9—H. C. Bradford, patent No. 120,903	144	89
No. 10—Heyl and Brehmer, patent No. 132,078	147	91
No. 11—H. R. Heyl, patent No. 175,457	155	97
No. 12—H. R. Heyl, patent No. 183,670	159	100
No. 13—Heyl and Brehmer, patent No. 191,426	170	108
No. 14—J. C. Smyth, patent No. 187,189	180	117
No. 15—Isaac W. Heysinger, patent No. 226,402	183	119
No. 16— " " " 274,941	187	123
No. 17—G. W. McGill, patent No. 220,834	191	128
No. 18—M. Toulmin, patent No. 267,283	194	130
No. 19—G. W. McGill, patent No. 212,316	200	134
No. 20—D. M. Somers, patent No. 200,774	209	142
No. 22—J. S. Palmer, patent No. 90382	215	148
No. 23—W. J. Brown, Jr., patent No. 218,227	217	149
No. 25— " " " 260,365	220	151
Complainant's testimony in rebuttal	222	153
Testimony of Isaac W. Heysinger	222	153
Argued on pleading and proofs	239	163
Opinion	239	163
Interlocutory decree	240	165
Master's report	243	166
Complainant's exceptions	265	174
Respondents' exceptions	266	174
Argued on exceptions to master's report	269	175
Final decree	269	175
Appeal to Supreme court	271	176
Bond on appeal	272	176
Citation	273½	177
Clerk's certificate	274	177

1 UNITED STATES OF AMERICA, }
Eastern District of Pennsylvania, } ss:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit. In Equity.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. LOREN HEYSINGER, Doing Business under the Name and Style of The Philadelphia Novelty Manufacturing Company,

vs.

J. P. CRAWFORD.

Pleas and proceedings before the honorable the judges of the circuit court of the United States in and for the eastern district of Pennsylvania, in the third circuit, of April sessions, 1883, No. 40.

It is thus continued:

Be it remembered that on the 9th day of June, A. D. 1883, Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, doing business under the name and style of The Philadelphia Novelty Manufacturing Company, by their solicitor, Joshua Pusey, Esq., come into court here and file their bill of complaint against J. P. Crawford in the words following, to wit:

2 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, Sitting in Equity. April Sessions, 1883.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. LOREN Heysinger, Doing Business under the Name and Style of The Philadelphia Novelty Manufacturing Company,
vs.
J. P. CRAWFORD. } No. 40.

To the honorable the judges of the circuit court of the United States in and for the eastern district of Pennsylvania:

Isaac W. Heysinger and Christian H. Hershey, residents of the city and county of Philadelphia and State of Pennsylvania, and J. Loren Heysinger, resident of the county of Montgomery, in said State, doing business in the said city and county of Philadelphia, under the name and style of the Philadelphia Novelty Manufacturing Company, and citizens of said State of Pennsylvania, bring
3 this their bill of complaint against J. P. Crawford, resident of and doing business in the city and county of Philadelphia, State of Pennsylvania, and a citizen of said State.

I. And thereupon your orators complain and say—

That heretofore and before the 25th day of September, A. D. 1877, Henry R. Heyl, being then a citizen of the United States, was the true, original, and first inventor of a certain new and useful improvement in devices for inserting metallic staples not known or used before and not in public use or on sale for more than two years prior to his application for a patent therefor.

And your orators further show unto your honors that he, the said Henry R. Heyl, so being the inventor of said improvement, made application to the proper department of the Government of the United States for letters patent in accordance with the then existing acts of Congress, and having duly complied in all respects with the conditions and requirements of the said acts; and that on the 25th day of September, A. D. 1877, letters patent of the United States, numbered 195,603, signed, sealed, and executed in due form of law, for the said invention or discovery were issued to the said Henry R. Heyl, whereby there was secured to him, his heirs, executors, administrators, and assigns, for the term of seventeen years from the 25th day of September, A. D. 1877, the full and exclusive right of making, using, and vending to others to be used, the said invention or discovery throughout the United States and Territories thereof.

And your orators further show unto your honors that he, the said Henry R. Heyl, did, on or about the 20th day of March, A. D. 1878, by an assignment in writing of that date, sell, assign, and transfer unto one George W. Heyl, then of the city and county of Philadelphia, State of Pennsylvania, all his, the said Henry R. Heyl's, right, title, and interest in and to said letters patent and invention, which assignment was duly recorded in the Patent Office of the
4 United States, as by said assignment or a duly authenticated copy thereof and the certificate of such recording thereto affixed, ready in court to be produced, will fully and at large appear.

And your orators further show unto your honors that he, the said Henry R. Heyl, with the concurrence of all parties owning any interest in said letters patent, having afterwards for good and lawful cause surrendered said original letters patent numbered 195,603 to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, did, on the twelfth day of July, A. D. 1881, obtain new letters patent, numbered 9803 of reissued letters patent, for the same invention for the residue of said term of seventeen years, which said last-mentioned letters patent were issued to Henry R. Heyl, assignor to George W. Heyl, in due form of law, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year last aforesaid, as by the said last-mentioned letters patent or a duly authenticated copy thereof, in court to be produced, will appear.

And your orators further show unto your honors that on or about the 23d day of November, A. D. 1881, the said George W. Heyl, by an assignment in writing of that date, did sell, assign, and transfer unto your orators all his right, title, and interest in and to said reissued letters patent and invention, which assignment was duly recorded in the Patent Office of the United States, as by said assignment or a duly authenticated copy thereof and the certificate of such recording thereto affixed, ready in court to be produced, will fully and at large appear.

And your orators further show unto your honors that by virtue of the said assignment they became possessed of and are now possessed

of the entire interest granted by the letters patent aforesaid throughout the United States and the Territories thereof, and are fully
5 authorized to maintain actions at law or in equity for the infringement of said reissued letters patent.

And your orators further show unto your honors that your orators brought a suit in equity in the circuit court of the United States in and for the eastern district of Pennsylvania against one William J. Brown, Jr., to restrain him from violating and infringing the rights of your orators under said reissued letters patent No. 9803, in which suit your orators prayed, *inter alia*, that the said William J. Brown, Jr., might be restrained by order and injunction from making, using, and selling the devices for inserting metallic staples, described in said reissued letters patent, and that the said William J. Brown duly appeared and filed an answer therein denying the infringement of said reissued letters patent and the validity thereof; that said suit came on to be heard upon final hearing on bill, answer, and proofs, and was argued at length by counsel for both parties, respectively, before the Honorable Judges William McKennan and William E. Butler, and thereupon the said court decided against the said William J. Brown, Jr., and affirmed the validity of said reissued letters patent, and a perpetual injunction was granted and decreed by the court upon the 21st day of October, A. D. 1882, as prayed for in the bill of complaint filed in the cause.

And your orators further show that your orators have applied the said improvement to great practical use, and have been, and but for the infringement hereinafter complained of would be still, in the undisturbed possession, use, and enjoyment of the exclusive privileges secured by the said reissued letters patent and in receipt of the profits of the same.

And your orators further show unto your honors, as they are informed and believe, that the defendant, well knowing all the facts hereinbefore set forth, is now making, using, and vending the said patented invention or inventions, in some parts thereof substantially the same in construction and operation as in the said reissued letters patent mentioned, the exclusive right to make, use, and
6 vend which throughout the United States and the Territories thereof is thus by law vested in your orators.

And so it is, may it please your honors, that the said defendant, as your orators are informed and believe, without the license of your orators, against their will, and in violation of their rights, has made, sold, and used, and intends to continue still to make, sell, and use, the said improvement within the eastern district of Pennsylvania, all of which is in violation of the said your orators' reissued letters patent.

To the end, therefore, that the defendant may, if he can, show reason why your orators should not have the relief hereby prayed, and that he may make a full disclosure of all the matters aforesaid, and upon his corporal oath, and according to the best and utmost of his knowledge, remembrance, information, and belief, full, true, direct, and perfect answer make to such of the several interrogatories

hereinafter numbered and set forth, as by the note hereunder written it is required to answer—that is to say:

I. Whether the said letters patent were granted and issued and assigned and afterwards reissued and assigned as hereinbefore set forth.

II. Whether the said defendant has at any time, and during what period of time, made, sold, or used any, and how many, of the devices for inserting metallic staples constructed in whole or in part upon the principle and substantially in the manner described in said reissued letters patent No. 9803, and when and how the same were constructed; describe minutely and in detail their construction and mode of operation.

And now, to the end that the defendant may be compelled to account for and pay over the income thus unlawfully derived from the violation of the rights of your orators as above, and be restrained from any further violation of said rights, your orators pray that your honors may grant a writ of injunction restraining the defend-
7 ant from any further construction or sale or use in any manner of said patented improvements or any part thereof in violation of the rights of your orators as aforesaid, and that the improvements now in the possession of the said defendant may be destroyed or delivered up to your orators for that purpose.

And also that your honors, upon the rendering of the decree for an infringement, as above prayed for, may proceed to assess, or cause to be assessed under your direction, in addition to the profits to be accounted for by the defendant as aforesaid, the damages your orators have sustained by reason of such infringement; and that your honors may increase the actual damages so assessed to a sum equal to three times the amount of such assessment under the circumstances of the wilful and unjust infringement by said defendant as herein set forth.

And your orators pray also for a provisional or preliminary injunction, and for such other relief as the equity of the case may require and to your honors seem meet.

May it please your honors to grant unto your orators not only a writ of injunction conformable to the prayer of this bill, but also a writ of subpœna of the United States of America, directed to the said defendant, and commanding him to appear and answer unto this bill of complaint, and to abide and perform such order and decree in the premises as to the court shall seem meet and be required by the principles of equity and good conscience.

ISAAC W. HEYSINGER,
One of the Above Complainants.

JOSHUA PUSEY,
Solicitor and of Counsel for Complainants.

NOTE.—The defendant is required to answer each of the foregoing interrogatories, numbered I to II, inclusive.

JOSHUA PUSEY,
Solicitor and of Counsel for Complainants.

8 UNITED STATES OF AMERICA, *Eastern District of Pennsylvania,* } ss:

Isaac W. Heysinger, one of the complainants in the foregoing bill named, being duly sworn, says that, so far as the statements therein contained are within his own knowledge, they are true, and so far as they derived from the information of others he verily believes them to be true, and he further says he verily believes the said Henry R. Heyl in said bill named to be the original, true, and first inventor of the new and useful improvement in devices for inserting metallic staples, which is described in the reissued letters patent No. 9803 mentioned in the foregoing bill; and he verily believes that the title of complainants as set forth in said bill is true.

ISAAC W. HEYSINGER.

Sworn to and subscribed before me this eighth day of June, A. D. 1883.

[SEAL.] P. O. DURNELL, *Notary Public.*

(Endorsed:) No. 40. April session, 1883. U. S. circuit court, eastern district of Penna. Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, doing business under the name and style of The Philadelphia Novelty Manufacturing Company. J. P. Crawford. Bill in equity. Issue subpœna returnable to first Monday in July, 1883. Joshua Pusey, solicitor for complainants. Filed June 9, 1883.

9 And afterwards, to wit, on the 9th day of August, A. D. 1883, the defendant, by his solicitor, comes into court here and files his answer to the bill of complaint of complainants in the words following, to wit:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sessions, 1883.

ISAAC W. HEYSINGER *et al* vs. JAMES P. CRAWFORD. } No. 40.

The answer of James P. Crawford, defendant, to the bill of complaint of Isaac W. Heysinger, Christian H. Hershey, and J. L. Heysinger, copartners trading as the Philadelphia Novelty Manufacturing Company, complainants.

This respondent, now and at all times hereafter, saving and reserving to himself all and all manner of benefit and advantage of exception that can or may be had or taken to the many errors, uncertainties, and other imperfections in the said complainants' said bill of complaint contained, for answer thereto, or unto so many and such parts thereof as he is advised is or are material or necessary to be answered unto by him, answering says:

First. This defendant, answering upon information, believes it to be true, as averred in said bill, that letters patent of the United

States, No. 195,603, were issued to one H. R. Heyl, dated September 25, 1877, and that the same were surrendered and reissued to
10 one G. W. Heyl, as reissued patent No. 9803, dated July 12, 1881; but defendant has no knowledge of the alleged assignments thereof in said bill mentioned, nor of the title thereto, and prays that complainants may be required to make due proof thereof.

Second. The respondent, further answering upon information and belief, says that it is not true, as averred in said bill, that the complainants or any of them are the assignees of the whole right, title, and interest of, in, and to said reissued letters patent, or have any power, right, or authority to sue thereon; but that the legal title to said patent is, as appears by the records of the Patent Office, in one George W. Heyl, who is not a party hereto, and that said complainants are merely licensees under said Heyl for such time as they may comply with the conditions of said license and pay the royalties and keep the covenants therein mentioned and contained. In consequence whereof this respondent is advised, and so charges, that the said bill is defective for want of proper parties complainant.

Third. This respondent, further answering, says that he is advised and believes, and so charges, that said reissued letters patent were absolutely null and void from their issue, and that the same were improvidently, wrongfully, and illegally granted, inasmuch as the said reissued letters patent describe and claim an alleged invention that is distinct from and dissimilar to, and not the same as the alleged invention described and claimed, in said original letters patent, and that new matter was interpolated into said reissued letters patent in contravention of law, which said new matter embraced certain important changes and alterations which had become known and used by the public and were extensively used as public property and did not belong to or have any part in the alleged invention of said Henry R. Heyl.

Fourth. And this respondent, further answering, says that
11 the said reissued letters patent are void for the reason that they contain claims for other and different devices and sub-combinations not claimed in said original letters patent, and which were extensively used as public property during the four years intervening between the granting of said original patent and the reissue thereof, and which (if the said Heyl ever had any right, title, or claim thereto, which this respondent denies) were lost, forfeited, waived, and abandoned by his laches and neglect, for the period of nearly four years, in applying for said reissued letters patent embodying, containing, and claiming the same.

Fifth. And this respondent, further answering, denies that said original letters patent were surrendered for any good and lawful cause, or that the said reissued letters patent describe and claim the same invention as that for which said original letters patent were issued or intended to secure; and these defendants aver that said original letters patent were not surrendered because of the same being inoperative or invalid by reason of a defective or insufficient specification arising from inadvertence, accident, or mistake without any fraudulent intent on the part of the said patentee; and these

defendants further aver that said original letters patent were surrendered and false and fraudulent representations made with intent to interpolate and claim in said new and reissued patent, and the same does contain interpolations and claims of and for more and other matter than was embraced in the alleged invention of said Heyl, for which said original letters patent were issued to him, and by reason thereof are wholly null and void.

Sixth. And this respondent further says, in denial of the relief in said bill prayed, that he is advised and believes, and so charges, that the devices described and claimed in said reissued patent, and the material and substantial parts of the thing patented, considered in the light of the state of the art at the time of making of said alleged invention and of application for and granting of said original patent, consist merely in changes in the form, proportion,
12 and arrangement of the parts thereof, the same being old and well known, such changes involving mere mechanical skill and being an obvious mode of producing the result claimed, and not producing any new result or constituting any new mode or means of producing the same result, and not involving any invention or discovery or patentability, and that said reissued letters patent do not, for the reasons aforesaid, describe or claim any patentable improvement or combination within the meaning of the acts of Congress relating thereto, and in consequence thereof were wrongfully and improvidently granted, and are null and void.

Seventh. And this respondent, further answering, says that he has not violated or infringed any exclusive rights of the complainants, nor infringed any of the claims of the said reissued letters patent, for that the devices hereinafter mentioned made and sold by defendant are substantially different, as respects the part or improvement patented, from the devices described and claimed in said reissued letters patent; and this defendant, in answer to the interrogating part of said bill, says that he has made and sold in Philadelphia for about a year last past staple driving and clinching tools, known as the "Victor" tool, which are wholly different from the devices described and claimed in said reissued patent, as respects the part or improvement patented, and were all made and sold by defendant under and in pursuance of letters patent of the United States, No. 218,227, dated August 5, 1879, assigned to him, and under license from the patentee of letters patent, No. 260,365, dated July 4, 1882; and that defendant's staple driving and clinching tools so made and sold by him as aforesaid were made by him in accordance with the said two last-mentioned letters patent, and the description and claims thereof therein contained, and which said devices are capable of conjoint as well as separate use.

Eighth. And this respondent, further answering, says that he is informed and believes, and so charges, that the said Henry
13 R. Heyl, in said bill named, was not the true, original, and first inventor of the alleged invention or any material and substantial part thereof described and claimed in and by said reissued letters patent therein recited, but that the said alleged improvement, or the material and substantial parts of the thing patented

and claimed therein as new and original, were long prior to the alleged invention or discovery thereof by the said Henry R. Heyl, or of his application for said original letters patent therefor, well known to and made and used by divers persons in the United States and elsewhere, and are found described in prior patents and publications, among others, viz:

Letters patent of U. S., No. 187,189, dated February 6, 1877, to J. C. Smyth.
No. 183,670, " Oct. 24, 1876, to H. R. Heyl.
No. 191,426, " May 29, 1877, to Heyl & Brehmer.
No. 168,736, " Oct. 11, 1875, to L. Goddu.
No. 158,013, " Dec. 22, 1874, to E. D. Averell.
No. 112,719, " March 14, 1871, to Jeremiah Keith.
Reissue, No. 7,904, dated May 2, 1876, to J. Keith.
No. 78,079, dated May 19, 1868, to Esser & Steere.
No. 120,903, " Nov. 7, 1871, to H. C. Bradford.
No. 132,078, " Oct. 8, 1872, to Heyl & Brehmer.
No. 175,457, " March 28, 1876, to H. R. Heyl.
No. 67,665, " August 13, 1867, to G. W. McGill.
14 No. 132,221, dated Oct. 15, 1872, to J. Tomlinson.
No. 56,884, " Aug. 7, 1866, to A. C. Betts.
No. 41,180, " Jan'y 5, 1864, to D. M. Smyth.
No. 144,401, " Nov. 11, 1873, to W. Malich.
No. 35,255, " May 13, 1862, to W. C. Perry.
No. 40,522, " Nov. 3, 1863, to —— Warren.
No. 50,539, " Oct. 17, 1865, to —— Wilson.
No. 55,189, " May 29, 1866, to —— Williams.

Without this, that there is any other cause, matter, or thing in said bill contained material or necessary for this defendant to make answer, and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided or denied, is true to the knowl-

edge or belief of this defendant; all which matters and things this defendant is and will be ready and willing to aver, maintain, and prove as this honorable court shall direct, and humbly prays to be hence dismissed with his reasonable costs in this behalf most wrongfully sustained.

J. P. CRAWFORD.

H. T. FENTON,
Sol'r for Def't.

15 UNITED STATES OF AMERICA, }
Eastern District of Pennsylvania, } *ss:*

James P. Crawford, the defendant in the foregoing answer named, being duly sworn, says that the facts set forth therein, so far as stated of his own knowledge, are true, and so far as stated upon information he verily believes the same to be true.

J. P. CRAWFORD.

Sworn & subscribed before me this 8th day of August, 1883.
W. VON A. WILLIAMSON, *Pro Cl'k.*

(Endorsed:) 40. April session, 1883. United States circuit court. Heysinger *et al. vs.* Crawford. Equity, No. 40. Answer. Hecter F. Fenton, solicitor for defendant. Filed August 9, 1883.

16 And afterwards, to wit, on the 8th day of September, A. D. 1883, the complainants, by their solicitor, come into court here and file their replication to the answer of the defendant in the word- following, to wit:

Replication.

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sessions, 1883.

HEYSINGER *et al.*
vs. } No. 40.
CRAWFORD.

The replication of Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, complainants, to the answer of J. P. Crawford, defendant.

These repliants, saving and reserving all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto, say that they will aver and prove the said bill to be true, certain, and sufficient in the law to be answered unto, and that the said answer of the said defendant is uncertain, untrue, and insufficient to be replied unto by these repliants, without this, any other matter or thing whatsoever in the said answer contained material or effectual in the law to be replied unto, confessed and avoided, traversed or denied, is not true; all which matters and things these repliants are and will be ready to

aver and prove as this honorable court shall direct, and humbly pray as in and by the said bill they have already prayed.

JOSHUA PUSEY,
Counsel for Complainants.

17 (Endorsed:) No. 40. C. C. U. S., eastern district of Penna. In equity. April sess., 1883. Heysinger *et al. vs.* J. P. Crawford. Replication. Joshua Pusey, counsel for complainants. Filed September 8, 1883.

18 And afterwards, on the day and year last aforesaid, the complainants, by their solicitor, come into court here and, the consent of the defendant being first had and obtained, file their amendment to the bill of complaint in the words following, to wit:

Amendment to Bill.

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sessions, 1883.

ISAAC W. HEYSINGER *et al.*
vs.
JAMES P. CRAWFORD. } No. 40.

And now, to wit, the 7th day of September, A. D. 1883, by consent of counsel for defendant, the bill in equity in the above cause is hereby amended as follows:

(1.) By inserting the name of "George W. Heyl, resident in the city of Canton and State of Ohio and a citizen thereof," in the title of the bill, and also after the word "Pennsylvania," in the second line from the top of page 2.

(2.) By inserting the words "your orator" between "1881" and "the," near the end of the next to the last line on page 3.

(3.) By inserting the words "or instrument" between "assignment" and "in," on the last line of page 3.

(4.) By inserting between the words "did" and "sell," at the beginning of the first line of page 4, the following: "Subject to certain conditions subsequent herein set forth."

19 (5.) By inserting after the word "orators," in the same line and page, the names "Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger."

(6.) By inserting after the word "appear," at the end of the seventh line of page 4, the following: "And your orators aver that the said your orators, Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, have always heretofore and now fully complied with the terms and conditions contained or mentioned in the said last-mentioned assignment or instrument."

(7.) By substituting the words "assignments or instruments" for the word "assignment," in line ninth of page 4.

Canton, Ohio, August 31, 1883.

GEORGE W. HEYL.

JOSHUA PUSEY,
Solicitor for Complainants.

(Endorsed:) No. 40. April sess., 1883. C. C. U. S. In equity. Heysinger *et al. vs.* Crawford. Amendment to bill of complaint. This may be filed with like effect as though leave of court had been obtained. H. T. Fenton, sol'r for def't. Filed September 8, 1883. J. Pusey, for complainants.

20 *Complainants' Testimony-in-Chief.*

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sess., 1883.

ISAAC W. HEYSINGER *et al.*
vs.
JAMES P. CRAWFORD. } No. 40.

Proofs taken on behalf of the complainants before Francis S. Brown, examiner, at the offices of H. T. Fenton, Esq., complainants' solicitor, No. 905 Walnut street, Philadelphia, pursuant to notice.

TUESDAY, *September* 18, 1883.

Present: Joshua Pusey, Esq., solicitor for complainants; H. T. Fenton, Esq., solicitor for respondent.

Complainants offer in evidence a certified copy of reissued letters patent No. 9803, granted to George W. Heyl July 12, 1881, for a device for inserting metallic staples, being the letters patent upon which this suit is brought.

Also copy of an assignment of letters patent No. 195,603, dated September 25, 1877, granted to Henry R. Heyl, for an im-
21 provement in devices for inserting metallic staples, made by Henry R. Heyl to George W. Heyl and bearing date March 20, 1878.

Also a copy of an assignment of said reissued letters patent No. 9803, granted to George W. Heyl July 13, 1881, for improvement in devices for inserting metallic staples, made by George W. Heyl to the complainants, Isaac W. Heysinger, Christiam H. Hershey, and J. Loren Heysinger, dated November 23, 1881.

It is agreed by defendants' counsel that said copies of assignments are true copies of the original assignments, and shall have the same effect as evidence as if they were the originals.

Also an implement for driving and clinching metallic staples, entitled the "Victor," which is produced by the defendant and admitted by him to be one of the implements made and sold by him previous to this suit, marked Complainants' Exhibit A.

ISAAC W. HEYSINGER, a witness called on behalf of the complainant, being duly sworn and examined by Mr. PUSEY, says:

Q. 1. You are one of the complainants in this case?

A. 1. I am.

Q. 2. Your firm is largely engaged in the manufacture and sale of implements for driving and clinching staples?

A. 2. It is.

Q. 3. You have been engaged for some years in manufacturing substantially such implements as are described in the patents upon which this suit is brought, aren't you?

A. 3. We have.

Q. 4. Please produce samples of these tools so made by you?

A. 4. Witness produces a staple-driving tool, which is offered in evidence and is marked Complainants' Exhibit B; also such a tool, which is offered in evidence and is marked Complainants' Exhibit C.

22 Q. 5. State whether or not you pay a royalty on these tools or either of them, and to whom.

A. 5. We pay a royalty on the tool marked Complainants' Exhibit B to George W. Heyl, and would be obliged to pay a royalty on the tool marked Exhibit C had we not been exempted therefrom by a special arrangement with Mr. Heyl, made some years since, before we acquired any special right from him.

Cross-examined by Mr. FENTON:

X Q. 6. How long have you been engaged in manufacturing tools like Exhibits B and C?

A. 6. The tool marked Exhibit B we have manufactured for between two and three years, I think; the smaller tool, Exhibit C, we have manufactured for about three and a half years or thereabouts.

X Q. 7. Did you make any tools like Exhibits B or C prior to the assignment or contract with you dated November 23, 1881?

A. 7. We made both before that date.

X Q. 8. By what authority, if any?

A. 8. By authority of a license from George W. Heyl and letters patent granted to me in the beginning of the year 1880.

X Q. 9. Was the license in writing, and what was its date?

A. 9. It was in writing; I do not know the date; it was in the latter part of 1880 or the early part of 1881, I think.

X Q. 10. Was it prior to the reissue?

A. 10. To the best of my recollection, it was.

X Q. 11. Did you pay royalty under that license?

A. 11. We did.

X Q. 12. What machines did you manufacture under it, Exhibit B or C?

A. 12. Both; the Exhibit C paid no royalty by special agreement.

23 X Q. 13. Was the special agreement you refer to part of the license?

A. 13. It was included in the license—that is, the exemption was included. I will produce the original or a copy of it.

X Q. 15. Was not Exhibit C excluded from the payment of royalty under that license on the ground that it was covered by your patent of April 13, 1880?

A. 15. By no means; it was excluded because we had been manufacturing the goods for some time, and had spent a great deal of money in developing the trade before we discovered that our letters patent gave us no right to manufacture the two, but that the right

was either in Mr. George W. McGill or Mr. Heyl. After a careful examination of the whole ground we satisfied ourselves that we would be obliged to abandon the manufacture unless we secured the right to manufacture from the owners of the Heyl patent. We looked them up and made as good an arrangement as we could, and found him willing to concede us the right to manufacture the small tool known as Exhibit C, which we had been manufacturing, provided we paid royalty on all other forms. This concession was made us for a money payment in advance and the obligation to defend the validity of the patent, and assume all legal expenses of establishing and maintaining the same without cost to the owner. It was a simple matter of bargain, the subordinancy of the Exhibit C and the patent under which it was made being fully recognized then and since.

X Q. 16. Is Exhibit C excluded from the payment of royalty under the contract of November 23, 1881?

A. 16. Yes; this assignment is a mere amplification or restatement in stronger legal terms, as I understand it, of what was intended to be granted by the previous license.

X Q. 17. Was not the fact of Exhibit C being patented by you April 13, 1880, one of the reasons why it was excluded from the payment of royalty?

A. 17. I did not so understand it. Had Heyl been in shape
24 to contest I am satisfied that he would have beaten us, and was so satisfied at the time. I had made a very complete study of the state of the art which had been forced upon me by a very expensive and annoying legal contest, forced upon us in Great Britain by the holders of the McGill patent, and in endeavoring to find means to defeat the McGill patent we were obliged to make this investigation.

X Q. 18. Since the year 1881 have you paid more than two hundred dollars a year royalty under the license of November 23, 1881?

(Objected to as immaterial.)

A. 18. The royalties have been greatly lessened by infringements which we are now contesting under the obligations of our assignment and as a part of the condition on which we are exempt on the Exhibit C. I am not able to give a direct answer as to the exact amount. If the legal expenses of these contests paid by us up to date be included, as they should be, the total amount will be considerably over a thousand dollars.

X Q. 19. (Question is repeated, with the explanation that the question related solely to the royalties under article 2 of the contract and not to legal expenses under article 4.)

A. 19. I think not.

X Q. 20. Are you willing to swear that your firm made for sale a single implement like Exhibit B within the last two years?

A. 20. We have just received from the foundry more than half a ton of castings for this tool, and have had two men constantly busy on previous lots of the same amount for several months past. Our

trade on these tools is rapidly increasing. We expect to quadruple our sales within the next year. It gives excellent satisfaction.

X Q. 21. Then it is not true, as has been previously alleged in this case, that the alleged infringements have interfered with your orders for and sales of this machine. Is that so?

25 A. 21. The infringements have very greatly diminished our sales; and my opinion that we shall quadruple our sales next year is based on the fact that we expect to stop infringements very soon. Our agents constantly urge us to greater vigor against infringers, who do us great injury, both by competition and public misrepresentation of the facts.

X Q. 22. Since November, 1881, to the present date what proportion of tools like Exhibit B have you sold as compared with Exhibit C?

A. 22. The proportion is relatively small. The Exhibit C sells at one-third the price of Exhibit B, and answers the same purpose. We had our trade established on Exhibit C before we commenced manufacturing Exhibit B. We had to push Exhibit B against the trade of Exhibit C as well as other infringements called into being by the success of Exhibit C.

X Q. 23. Please state the proportion as nearly as you can since the fall of 1881.

A. 23. Probably one of Exhibit B to fifty of Exhibit C, though the proportion now is much greater. We are now selling relatively more of Exhibit B.

X Q. 24. Are all the Heyl tools you make now and have made within the past two years exactly like Exhibit B; and, if not, wherein consists the difference?

A. 24. The Heyl tool is the only tool for driving staples which we manufacture. We have several subordinate patents, but they are all Heyl tools.

X Q. 25. Was the reissue of the Heyl patent obtained at your instance?

A. 25. Not specially. The patent was examined by our counsel and by the solicitor who obtained the original patent and who stated that it should be reissued and that the original patent was defective as it stood, while the invention was perfectly clear. This was the conclusion of others.

X Q. 26. Was it not done at your suggestion?

A. 26. I never suggested it to the owner of the patent. I
26 may have suggested it to others, and I may say that after we had once satisfied ourselves that it could be reissued against us if held by others it was our obvious right and duty on securing control of it to protect the invention which it was designed to cover but did not.

X Q. 27. Then was it your opinion that the original Heyl patent did not cover a detachable staple driver like that shown in Exhibit C, and hence your suggestion that it ought to be reissued?

A. 27. I have not said that I suggested it; neither have I said that the original patent would not legally cover the form Exhibit C. My own opinion was that one of the most important claims of the original

patent was for a combination, which lacked an element to make it operative. This fact was afterwards corroborated by the examiner, who refused to pass the same claim in the reissue in its original form for the reason that it was an inoperative combination.

X Q. 28. What element do you refer to?

A. 28. The element found in line 2, claim 1, of the reissue "and the sliding staple guide B." No two could operate by a simple hammer and anvil without the invention of a staple guiding channel, which could slide with reference to the hammer and anvil, so as to uncover successively the length of the legs of the staple as the same were projected through the intervening papers and into the clinching recess by the forcible approach towards each other of the hammer and anvil.

ISAAC W. HEYSINGER.

Sworn and subscribed before me this eighteenth day of September, A. D. 1883.

FRANCIS S. BROWN, *Examiner.*

HENRY R. HEYL, a witness called on behalf of the complainants, being duly sworn and examined by Mr. PUSEY, says:

27 Q. 1. What is your name, age, residence, and occupation?

A. 1. Henry R. Heyl; age, 41 years; residence, 4050 Aspen street, Philadelphia; occupation, inventor.

Q. 2. You are the inventor and original patentee of the invention described in reissue No. 9803, in evidence in this case?

A. 2. Yes, sir.

Q. 3. Did you manufacture implements under your patent?

A. 3. I had large numbers of them manufactured for me.

Q. 4. You made them in several different forms, I believe?

A. 4. Yes, sir.

Q. 5. In other forms beside those particularly shown in the drawings of the patent?

A. 5. I have never sold any in any form except those shown in the drawings of the original letters patent and the reissue, excepting the inverted form which is shown in the exhibit which I now produce.

(The implement produced is offered in evidence and marked Complainants' Exhibit D.)

Q. 6. When did you make or sell implements of which the form Exhibit D is a sample?

A. 6. I commenced to manufacture such implements in the fall of 1878, and began to sell them in January, 1879.

Q. 7. Was there any other part used in connection with this form? If so, state what it was.

A. 7. The only other part which I originally intended to incorporate into this form was a spring to elevate the driver, which, however, for reasons which seemed to me then sufficient, I did not put upon all the tools.

Q. 8. Are you familiar with the state of the art with reference to machines for inserting staples up to the date of your original patent?

A. 8. For many years much of my time was devoted to the
28 invention of machines for inserting and clinching wire staples in paper boxes, books, etc., during which time I acquired a pretty thorough knowledge of the state of the art to which these machines pertained.

Q. 9. Please examine reissued patent 9803 and also the implement marked Complainants' Exhibit A, which I now hand you, and state, as an expert, whether or not you find the invention described and claimed in said reissue embodied in said Exhibit A; state also the special claims in said reissue which, in your opinion, if any, of the claims there are infringed by that exhibit.

A. 9. Upon an examination of the tool, Exhibit A, and reissued letters patent No. 9803 it appears to me that the said tool embodies the devices patented in said reissue by the second, fourth, and eighth claims thereof, more especially.

Q. 10. You say more especially. Do you find any other claims that are infringed by this exhibit, in your opinion?

A. 10. Having named the said claims more especially, I did not mean thereby to exclude any of the others, which, upon a second and closer examination, I think some thereof might be added to the list, which are, possibly, the first and sixth.

Q. 11. State whether or not you had any interest in the result of the application for the reissue of the original patent and whether or not you have any interest in the result of this present suit.

A. 11. I had and have no interest in either case.

Cross-examined by Mr. FENTON:

X Q. 12. Please look at Exhibit A and tell me what part of that apparatus you think is the equivalent of the "reciprocating driver provided with the knob G" mentioned in the second claim.

A. 12. This tool, Exhibit A, is one of the inverted forms wherein
29 the several devices perform exactly the same function, but wherein the hand knob and the resisting base are changed about, so that the blow of the hand is struck from the opposite end of the stapling device from that shown in the drawings of reissue patent 9803, which tool, Exhibit A, is like the tool, Exhibit D, in this respect. The mere inversion of the knob does not constitute invention, but simply a matter of preference, while the devices all operate with reference to each other to perform the same end in exactly the same order and manner.

X Q. 13. The question is repeated, with a request for a specific answer.

A. 13. That part of the device which in this instance is the lower arm and contains the clinching cavity and which in this case sustains by resistance the driving and clinching blow of the hand from the opposite part of the tool.

X Q. 14. Look at claim 2 of the reissued patent and say whether or not any of the elements of that combination claimed are novel with you.

A. 14. In my opinion, they are novel.

X Q. 15. You probably did not understand my question. Did you mean to say that you were the first inventor of a staple guide, B, of an anvil, A^1, of a coil spring, D, and of a reciprocating driver, with a knob to it, or any of them, alone and separate from the others?

A. 15. I did not mean by my answer that these devices, separate from the other, formed in themselves elements of distinct novelty; I meant that their combination for the purpose specified was novel.

X Q. 16. And that only? Is not that so?

A. 16. I think it is.

X Q. 17. Is the stationary staple-clinching base of Exhibit A capable under any circumstances of being reciprocated or intended to be so used?

A. 17. Yes; without answering the question as to the intention of the designer of the device, Exhibit A, it is perfectly practical to make the so-called stationary base the movable part of this device, and that which is herein intended to be the movable part to become the stationary part, by simply inverting the tool and striking upon the base, or the same tool may be laid upon its side, and by the pressure of both hands each of the two parts of the tool becomes movable toward the other and operate practically to insert and clinch a staple. The necessary force to be used in the application of this tool simply requires an equivalent resistance to make the two parts of the tool perform their duty always in like manner.

X Q. 18. As Exhibit A is constructed is it not impossible with that specific device to use the stationary-recess anvil in any other way than as a stationary and not a reciprocating driver?

A. 18. As I have said, the specific device now in my hand is capable of being used practically, just as described in my last answer.

X Q. 19. As Exhibit A is constructed is not the clinching base to be laid upon the table when the blow is struck; and, if so, is it not a stationary driver only?

A. 19. Yes; it is evident that the clinching base is intended to rest upon a firm object and be the stationary part of the device, just as in the tool of my construction, viz., Exhibit D; but while this clinching base is thus stationary with reference to the table that it rests upon it is, nevertheless, practically movable toward the staple-inserting device.

X Q. 20. Then you mean to say that the stationary-recess clinching base of Exhibit A is the mechanical equivalent of the reciprocating driver of the reissued patent; is that so?

A. 20. Yes, sir.

X Q. 21. And hence you consider it an infringement when used in connection with the other elements?

A. 21. Yes, sir.

X Q. 22. Please tell me where in Exhibit A you find the "two opposite jaws" mentioned in claim 4 of the reissue.

A. 22. They are there, united to each other by a pivot or
31 rocking joint, the one jaw containing the clinching cavity and the other jaw, when the tool is in use, contains the staple-driving devices.

X Q. 23. Then if the upper jaw or guide arm was omitted would you consider that device, Exhibit A, to infringe the fourth claim of the reissue?

A. 23. No, sir.

X Q. 24. Without that upper jaw or guide arm, then, the staple driver and clinching base, Exhibit A, would not be the machine of the reissued patent; is not that so?

A. 24. Yes, sir.

X Q. 25. Are you one of the patentees named in letters patent to Heyl & Brehmer, dated May 29, 1877?

A. 25. Yes, sir.

X Q. 26. And do you not find in that patent a reciprocating staple driver for holding and driving a staple, marked "No. 28" in the drawing of that patent, in combination with a slotted plate, marked "No. 67," countersunk at its ends, which latter serves as a stationary clinching base, to partially bend the legs of the staple when driven through stock by the staple driver 28?

A. 26. I do find therein a staple driver, and also the plate you have described containing the slot with recessed ends, but the said recessed ends of said slot have nothing whatever to do with the clinching operation, this latter operation being done entirely by rocking jaws situated back of the slotted plate and operating in said slot as a guideway.

X Q. 27. Will you please look at letters patent granted to you October 24, 1876, for a machine for forming, inserting, and clinching staples, and state if you do not find therein staple guiding and driving mechanism in combination with a guard plate, N, "having a narrow slot, with two countersunk enlargements in it at points opposite to the entrance of the staple legs" for guiding the latter towards each other and serving partially to clinch the same?

32 A. 27. I find the devices described in the question, but the said slot in the guard plate, having two countersunk recesses in it and having no bottom, is merely a guide to direct the two opposite staple legs into position where the two rotating clincher jaws may certainly strike them and bend and clinch the same, so that the element of an unmovable recess clincher and the element of a reciprocating driver provided with a knob are not found in said machine described in said letters patent.

X Q. 28. Apart from the knob, however, you find in that patent, do you not, a reciprocating staple guiding and driving mechanism in combination with a slotted guard plate to direct and partially bend the staple legs toward each other?

A. 28. Yes, sir.

X Q. 29. In your original patent on which your reissue and this suit is founded do you not find therein that the "recess F is so shaped that as the staple legs enter thereinto (the papers) they will strike the concave or slanting walls of said recess, and thus be bent

inward towards each other sufficiently to insure their being bent down properly when again struck between the faces of the guide B and the driver E," and does not that language describe the equivalent of the slotted guard plate mentioned in the last question to guide or partially bend or direct the staple legs only and requiring other mechanism or other means, as set forth in this original patent No. 195,603, to finally clinch the staple legs against the paper?

A. 29. You have described the device correctly, but there is a wide difference between a concave recess, which is capable of bending the two opposite staple legs toward each other until they meet and bear almost in a straight line toward each other, and a slotted guide plate which has no bottom and which is merely intended, as described, to keep the protruding staple legs from getting astray, so that the movable clinchers would not engage with them. In the former instance the concave recess is in itself a complete clincher, notwithstanding a subsequent pressure of the already clinched
33 staple is provided for for the purpose of more thoroughly flattening down the staple legs and embedding them to a certain extent in the material through which they have passed, thereby adding compression between the staple legs and staple crown, which in many cases is desirable as a complete clinch.

Adjourned to Wednesday, September 19, 1883.

WEDNESDAY, *September* 19, 1883.

Present: Joshua Pusey, Esq., counsel for complainant; H. T. Fenton, Esq., counsel for respondent.

Mr. Pusey, complainants' counsel, produces a certified copy of a license of George W. Heyl to the complainants, dated February 7, 1881, being the license referred to in the testimony of I. W. Heysinger's answer to question No. 13.

X Q. 30. In the machine as operated do not the countersunk enlargements in the guard plate N partially bend and direct the staple legs toward each other in the actual operation of that machine as it is described in the specification of your patent of October 24, 1876?

A. 30. No; not in the sense indicated by the question. The machine as constructed has the two countersunk enlargements, which are purely funnel shape, so situated opposite to the points where the staple legs should protrude through the book that in case, as frequently happens in driving a staple, the staple legs do not come out of the paper at the exact point where they should enter between the movable clinching plates, these countersunk cavities will correct any such deflection of the staple legs and bring them to a proper point where they will pass between the movable clinching plates. The clincher plates referred to in the specification of letters patent of October 24, 1876, No. 183,670, are so arranged that as the
34 staple legs pass between them they are slightly bent toward each other and rest firmly against the said swinging clincher plates.

X Q. 31. Is the slight bending, as you have used that term in the latter part of your last answer, produced by the staple legs coming in contact with the funnel-shaped recess in the guard plate?

A. 31. No.

X Q. 32. Does not your patent of October 24, 1876, say so?

A. 32. No, sir; said patent does not say so; but it distinctly says that the staple legs are bent toward each other by the clincher plates after the staple legs have been directed to said clincher plates by the concave portion of the slot in the guide plate.

X Q. 33. Then the difference between us in our understanding of that patent is that I use the words slightly bent and you use the word directed. Is not that so?

A. 33. No, sir; for you have misapprehended the function of the tapering cavities in the guide plate, which tapering cavities are countersunk to center holes, which are first bored in said guide plate just as far apart as the staple legs are before it has been inserted into the book. The purpose, then, of the tapering cavities at each end of the narrow slot are simply to direct the staple legs into the clinching device; and in all cases on these machines, if said movable clinching plates or jaws should be removed, there would be no bending of the staple legs toward each other beyond a perpendicular line from the back of the book.

X Q. 34. If a staple leg comes in contact with the side of a concave cavity forcibly is it not necessarily bent, even in ever so slight a degree, from a perpendicular line?

A. 34. No; for it will depend entirely whether the staple leg strikes the slanting surface from a perpendicular line, as the question terms it, or whether the staple leg impinges against said slanting surface at an angle. What I mean by this is if we drive a straight wire directly towards the apex of a cone or conical recess it will naturally pass to the center without touching the sides of the recess. If anything should be interposed which would deflect the wire from its natural course it would be carried by the incline of the said recess to its true course towards the base; and, as in practice, staple legs frequently are deflected from a true course through a number of sheets of paper, these conical slots referred to in my answer are merely to correct said deflection and bring the staple-legs again to their true position at right angles to the staple crown.

X Q. 35. In this patent of October 24, 1876, are the clincher plates in the position shown in figure 5 when in a state of rest and before beginning the operation of flattening down the ends or legs?

A. 35. The drawing, figure 5, represents them in a state of rest before they are operated to perform the function of clinching.

X Q. 36. That being so, the staple legs, after being forced through the paper, bear against the inclined faces of these clincher plates and are slightly turned inward, as set forth in that patent and shown in figure 5. Is not that so?

A. 36. Yes, sir.

X Q. 37. Are you the patentee of letters patent No. 175,457, dated March 28, 1876?

A. 37. Yes, sir.

X Q. 38. Does not that patent describe and show, *inter alia*, a tube with grooves to direct a staple into pasteboard, which is driven therein by a hammer, T, moving within a tube?

A. 38. Yes, sir.

X Q. 39. And how is the staple clinched on the pasteboard by that patent?

A. 39. The staple is clinched by the machine described in this patent by two movable clinchers operating towards each other to bend the staple legs down upon the pasteboard, there being
36 two forms of said clincher shown in this patent, one in figure 10, where the two jaws rotate towards each other about a common centre, and the other clincher, as shown in figure 11, is constructed by forming at the end of two parallel slide bars, which move in opposite directions in the same plane, clinching lugs, which draw the staple legs together and flat up against the under side of the pasteboard.

X Q. 40. Please look at the patent granted to yourself and August Brehmer, dated October 8, 1872, and say if that patent describes the machine for inserting and clinching metallic staples in paper stock.

A. 40. Yes; said machine is designed to staple paper boxes.

X Q. 41. And by that machine staples are driven through the paper by sudden percussion; is not that so?

A. 41. Yes, sir.

X Q. 42. And by that machine the staple to be driven is inserted in a plunger and driven through the stock by means of a hammer operated by a spring; is not that so?

A. 42. No, sir; this machine is constructed to make its own staple from a proper length of straight wire. The staple is made by a hollow bending fork passing around the wire and around a mandrel of the shape of the inside of the staple. This hollow bending fork has traversing within it a driving rod, which at the proper time, by the force of springs, after the mandrel is withdrawn, drives the staple out of the bending fork and through the paper of the box.

X Q. 43. Are you familiar with letters patent to Esser & Steere, No. 78079, dated May 19, 1868, and letters patent to H. C. Bradford, No. 120,903, dated November 7, 1871, both for inserting button ends into material and clinching down the ends onto the under side of the material?

A. 43. I do not remember having seen the patent of Esser & Steere, but that of Bradford I did examine some seven years since.

37 X Q. 44. And it shows a recessed clinching anvil for bending the ends against the under side of the material; is not that so?

A. 44. That is so, but whether the recessed clinching anvil is of one concave piece, or whether it is a concaved ring with a finishing plunger working upward through the center of it, I am, without reference to the patent, unable to state. Upon examination of the patent the clinching is performed first by a recessed clincher

and afterward by a flat-faced plunger coming firmly in contact with the bent legs of the button hook.

X Q. 45. You are aware, however, that it was not novel with you to use a recessed clinching anvil?

A. 45. Yes, sir.

X Q. 46. Are you familiar with letters patent No. 56884, dated August 7, 1886, to A. C. Betts, and also patent 132,221, dated October 15, 1872, to J. Tomlinson, both for staple guiding and inserting devices?

A. 46. I have seen both patents referred to.

X Q. 47. Do not they both describe a tube for holding a staple, in which tube is a sliding hammer, to be operated for driving a staple down through paper stock or other material?

A. 47. Yes, sir; so far as the action of the tool is described in the question, leaving out the purpose or material to be stapled, which I do not remember about.

X Q. 48. Do you know in round numbers how many United States patents have been granted for apparatus to be worked by hand for inserting and clinching metallic staples between the date of your original patent of September 25, 1877, and the application of May 10, 1881, for the reissue sued on in this case?

(Objected to as immaterial.)

A. 48. No, sir.

X Q. 49. Have you examined any of them, and can you state approximately their number?

(Same objection as to last question.)

38 A. 49. I cannot approximate the whole number, but I remember to have examined several.

X Q. 50. And did you examine them prior to the application for this reissue?

(Objected to as immaterial.)

A. 50. Yes, sir; some of them.

X Q. 51. Who suggested the application for the reissue, yourself or the plaintiffs?

(Same objection as before.)

A. 51. I am unable to state who suggested it.

X Q. 52. Did you not prepare all the claims of the reissued patent?

A. 52. I had something to do with the preparation of all of said claims in connection with the solicitor who prosecuted said reissue.

X Q. 53. Was it not the intention in preparing that reissue specification, either at the instance of yourself or the plaintiffs in this case, to so mould the claims as to bring within their scope and meaning the complainant's Exhibit C, then and now manufactured by them, as testified to by Mr. Heysinger yesterday?

(That part of the question is objected to which inquires of the witness as to the intention of any one but his own.)

A. 53. My intention in asking for the reissue and in preparing its claims were to obtain the fullest possible protection for my invention against all infringers who sought to take advantage of the oversight of my original specification.

X Q. 54. Do the claims, or any of them, of that reissue embrace the substantial features, to wit, the driving and clinching of the staple embodied in this Exhibit C manufactured by the complainants?

A. 54. Yes, sir. As said, Exhibit C is substantially the same device as Exhibit A, referred to in my previous examination.

39 X Q. 55. And in your opinion, then, the original patent was defective in not being broad enough to cover such a device; is that so?

A. 55. In my opinion, my original patent was defective, in that it did not cover the whole of my invention, and in framing the reissue it was no purpose of mine to cover broadly any form of device which was not invented by me.

X Q. 56. My question was whether you considered the original claims defective in not covering such a device as Exhibit C, and hence, in your opinion, it was necessary to apply for a reissue?

A. 56. Exhibit C, or devices like it, I do not remember to have taken into consideration as especially infringing my patent, but if the said reissue does cover such devices it was because the merit of the invention lay in me and I was entitled to full protection therefor.

X Q. 57. But the original claims did not cover such devices, although you now say you now consider them within the scope of your invention, and hence the claims now in the reissue were inserted.

(Objected to, as the question as to whether the original patent did in fact or not cover the device referred to, Exhibit C, is a question of law, and the opinion of the witness on questions of law of this character is immaterial.)

A. 57. I have no means of knowing how broadly said original claims would have been legally construed had the said original patent ever been litigated, but, in my judgment, the said claims were defective in that respect, and whether I have bettered them in the reissue remains to be seen.

X Q. 58. What was "the oversight" in your original specification that you speak of in your fifty-third answer?

A. 58. The oversight refers in general to the several matters which were corrected in the reissue. It will be impossible for me to point them out specifically at this time without refreshing myself upon the whole subject as gone into at that time.

40 X Q. 59. Did the alteration consist in anything else substantial other than a remodeling of the claims?

(Objected to for the reason that the original patent and reissue indicate the alterations that were made.)

A. 59. I am unable to answer that question at this time.

X Q. 60. Please state generally, if you cannot do so specifically, why you applied for that reissued patent with enlarged claims.

(Objected to because it is not shown, known, or admitted that the reissue contains any enlarged claims.)

A. 60. My motive in applying for the reissue was the justifiable one of obtaining the fullest protection that I could for my invention. I am not aware that any matter in the said reissue can be construed as enlarged claims.

X Q. 61. Do you consider it an essential feature of your invention that a device should contain a knob or other equivalent means of operating it by a blow of the hand, in the absence of which such device would not be in the claims of the patent?

A. 61. I do consider it essential to the device that the process of inserting the staple should be in some means by the force of the hand, as the tool is intended to be a hand-operating tool and not one of the class termed as power tools, or those operated by foot-treadle.

X Q. 62. Then it is to be operated as an essential feature of its operation by means producing a sudden percussion and not a gradual pressure; is that so?

A. 62. Not exclusively so, for the amount of percussion or pressure instead which will render the tool practical will indicate whether a blow is required or whether pressure alone will be sufficient.

X. Q. 63. If the reciprocating anvil or, in case of inverting
41 of the parts, the staple driver was operated directly by a hand lever, would that be the equivalent of your knob to be struck by the hand?

A. 63. Said device would contain all the equivalents, with the addition of a lever.

X Q. 64. If in figure 3 of the reissued patent the parts were reversed and the clinching anvil stationary at the bottom, and the staple guide reversed and put at the top of the device, would you consider such a construction to be within the claims of this reissued patent, and to be the substantial mechanical equivalent of the tool therein shown and described?

A. 64. Certainly.

X Q. 65. Will you please look at your reissued patent and tell me at what points of the curvature of the recess in the clinching anvil the staple legs must strike to effect a clinching?

A. 65. At the points opposite to where the staple legs come through the paper.

X Q. 66. And is it not at that particular point on either side of the recess that the clinching is effected?

A. 66. That particular point or any other one would not clinch a staple leg. It is the continuation of the curved recess that performs the work after the starting point has been struck.

X Q. 67. Do you state upon actual experience and after experiment?

A. 67. No, sir.

Re-examined by Mr. PUSEY, counsel for complainant:

Q. 68. In your reissued patent, as well as in the original, you speak of a stationary anvil. What did you mean by that expression?

A. 68. That it was stationary with reference to the table that it stood on as necessary to resist the impact occasioned by a blow of the hand upon the stapling device.

Q. 69. Then the term was one of description and not of limitation? Am I right or wrong?

A. 69. You are right.

42 Q. 70. In any of the letters patent antedating your original patent is there a machine shown or described in which it is designed, adapted, or capable of inserting staples singly by the hand into the mouth of the staple-guiding channel, and then of forcing the inserted staple through layers of stock to be united and clinching the same against a recessed clinching block?

A. 70. I know of none.

Q. 71. Are you or are you not aware of any machine previous to the date of the original patent in which the operation referred to in my previous question can be performed?

A. 71. I know of none.

Q. 72. And do you know of any machines for inserting and clinching metallic staples through paper or equivalent material, either patented or unpatented, previous to the date of your invention, which combined a recessed clinching anvil and opposed thereto and coacting therewith a sliding staple guide, having a staple driver contained therein, the staple being inserted in the mouth of the staple guide when the said opposed parts stand open to each other, whereby, when the staple driver is forced towards the clinching recess, the staples are driven through the paper and clinched?

A. 72. No, sir; I do not.

Q. 73. Do you consider, or otherwise, the sliding staple case or guide an essential part of the material part of your invention—that is, in combination with the other parts pointed out in the claims of the reissue?

A. 73. Yes, sir.

Q. 74. When did you first make the invention, to the best of your recollection?

A. 74. I think it was in July, 1877.

Q. 75. In your patented machine, what effect, if any, as to the degree of the clinch made thereby has the length of the staple legs?

43 A. 75. The completeness of the clinch is, to a certain extent, dependent upon a proper length of staple leg, yet that length may vary either way, either longer or shorter, and a very satisfactory clinch be obtained.

Q. 76. Is it not a fact that the length of the clinching recess and its depth affect the degree of the clinching?

A. 76. Yes, sir; the said clinching recess in length should have a proper dimension with reference to the length of the staple crown and a proper proportionate depth.

Q. 77. Who drew the specification of your original letters patent?
A. 77. I did it.
Q. 78. Were you expert in that business?
A. 78. That was not my business, but I thought I could do it.
Q. 79. Why did you draw your own specification?
A. 79. If my memory serves me correctly it was to save expense and to hurry the application forward.
Q. 80. Previous to the date of your invention had you known of any machine in use or capable of being practically used for the same purpose as your machine, as in the form of a desk tool or hand stamp for general office use?
A. 80. No, sir.

HENRY R. HEYL.

Sworn and subscribed before me this 19th day of September, A. D. 1883.

FRANCIS S. BROWN, *Examiner.*

Complainants rest.

44 COMPLAINANTS' EXHIBIT REISSUED LETTERS PATENT No. 9803.

Compl'ts' Reissue 903.

(2–175.)

12969.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissue letters patent granted George W. Heyl July 12, 1881, number 9803, for improvement in devices for inserting metallic staples.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 14th day of June, in the year of our Lord one thousand eight hundred and eighty-three, and of the Independence of the United States the one hundred and seventh.

[Seal Patent Office, United States of America.]

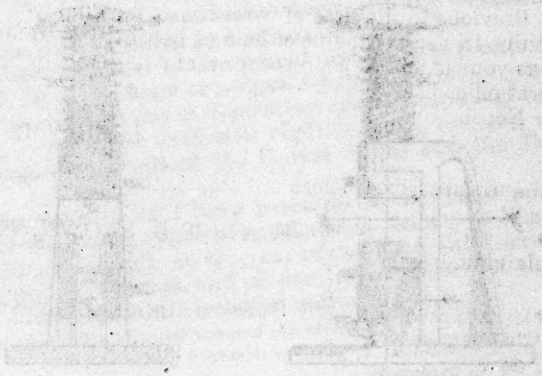
E. M. MARBLE,
Commissioner.

45 (2–155.)

Reissue No. 9803.

The United States of America to all to whom these presents shall come:

Whereas Henry R. Heyl, of Philadelphia, Pennsylvania, assignor to George W. Heyl, of same place, has presented to the Commissioner of Patents a petition praying for the reissue of letters patent



H. R. HEYL,

Assignor to C. W. Heyl.

DEVICE FOR INSERTING METALLIC STAPLES.

No. 9,803. Reissued July 12, 1881.

Fig. 1.

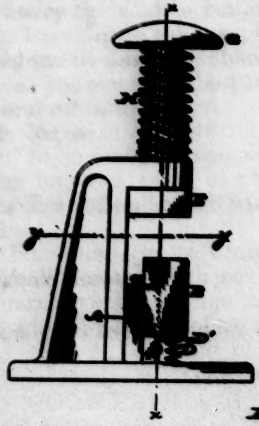


Fig. 2.

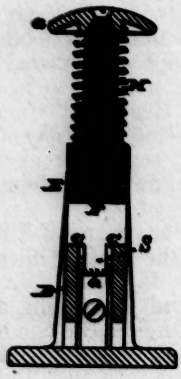
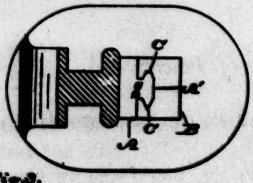


Fig. 4.



No. 52. Crawford v. Heysinger et al. p. 46

Fig. 3.

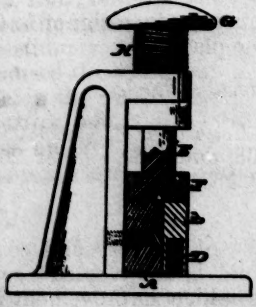
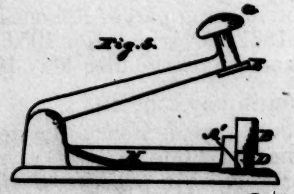


Fig. 5.



Witnesses:

Jno. A. Dinsmore

L. Bonville.

Fig. 6 Fig. 7 Fig. 8.

Inventor:

Henry R. Heyl,

by Crawford & Heysinger

Attorneys.

for an alleged new and useful improvement in devices for inserting metallic staples, for which letters patent were issued to him dated September 25, 1877, which letters having been surrendered the same have been canceled and new letters ordered to issue to said assignee on an amended specification, a description of which invention is contained in the specification, of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and

Whereas upon due examination made the said claimant is adjudged to be justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said George W. Heyl, his heirs or assigns, for the term of seventeen years from the twenty-fifth day of September, one thousand eight hundred and seventy-seven, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this twelfth day of July, in the year of our Lord one thousand eight hundred and eighty-one, and of the Independence of the United States of America the one hundred and sixth.

[Seal Patent Office, United States of America.]

S. J. KIRKWOOD,
Secretary of the Interior.

Countersigned:
E. M. MARBLE,
Commissioner of Patents.

(Here follows diagram marked p. 46.)

47 UNITED STATES PATENT OFFICE.

HENRY R. HEYL, of Philadelphia, Pennsylvania, assignor to George W. Heyl, of same place.

Device for Inserting Metallic Staples.

Specification forming part of Reissued Letters Patent No. 9803, dated July 12, 1881. Original No. 195,603, dated September 25, 1877. Application for reissue filed May 10, 1881.

To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in paper-fasteners, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figures 1 and 5 are side elevations of the fastener embodying my invention. Fig. 2 is a vertical section in line *x x*, Fig. 1. Fig. 3 is a side elevation, partly sectional. Fig. 4 is a horizontal section in line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of an implement of the form of a hand-stamp, by which metallic staples may be forced through sheets of paper or documents and secured by clinching the legs on the reverse side.

Referring to the drawings, A′ represents a stationary anvil, which is secured to or formed with an arm rising from a suitable stand of convenient form for use upon a writing-desk; and B represents a sliding guide-block fitted to the anvil A′ by a sliding joint, and having grooves C C, which match with the tongue of the anvil, the upper face of the block being flat. The normal position of the guide B is elevated, and in order to keep it in this position, or from dropping prematurely, I employ a spring, D, which may press up under the guide, or a spring, D′, which may press against it, and thus produce the necessary friction. E represents a reciprocating driver whose under face is flat, and in the same is a concave recess, F, said driver having a knob, G, for receiving the blows of the hand, and provided with a spring, H, for causing the return or elevation of the driver.

The operation is as follows: A staple is placed within the grooves C C with its crown resting on the anvil A′, the points thus being turned toward the bending recess F. The papers to be united are now placed beneath the driver, and by a sharp blow of the hand upon the knob G the driver is forced downward upon the papers. The staple legs come through the papers into the recess F, where they are bent over by the slanting ends thereof.

It will be seen that the grooves C C serve to support and guide the staple legs during their penetration through the papers, and the recess F is so shaped that as the staple legs enter thereinto they will strike the concave or slanting walls of said recess, and thus be bent inward toward each other, as shown in Figs. 2 and 3. A plate, *a*, may be advantageously employed to overlap the staple crown for preventing the latter from bending while the legs are being forced through the papers.

It will be seen that the staple support or anvil A′, with the slotted or recessed hammer, operates to insert a staple through layers of stock to be united, and simultaneously bends over its projecting ends.

In my original specification I described the further separate operation of completely flattening down the ends of the staple thus bent over by a second blow between the upper and lower jaw of the implement, believing that the same was new; but I have since learned that the same result was obtained by devices described in previous letters patent of the United States. Should the legs of the staple, when bent over by the same blow which drives the same, as is hereinabove described, be found not to lie sufficiently close to the surfaces of the paper, the same may be further flattened down by a second blow between flat surfaces in front of the staple-channel and bending recess respectively provided therefor.

Figs. 1, 2, and 3 show a hand-stamp embodying my invention, in

which the driver reciprocates in a fixed head in the manner of a plunger, while Fig. 5 shows the same invention embodied in a hand-stamp, in which the driver is mounted at the end of a vibrating arm pivoted at its rear extremity to the base, which rests upon the table.

It will be seen that the devices which constitute my invention are to be found in both these modifications, and that both operate in precisely the same manner to insert, by a blow upon the knob G of the hand-stamp, the staple through layers of stock to be united, and simultaneously bend over the projecting ends in the opposite bending recess provided therefor.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

48 1. The combination of the stationary staple-support or anvil A′ and the sliding staple-guide B with the reciprocating slotted or recessed hammer operating to insert a staple through layers of stock to be united, and simultaneously bend over its projecting ends, substantially as and for the purpose set forth.

2. In a device for inserting metallic staples, the combination of the staple-guide B, anvil A′, spring D, and reciprocating driver, provided with the knob G, the whole arranged to operate substantially as and for the purpose set forth.

3. A staple-inserting implement having two opposite jaws arranged with relation to each other, substantially as shown, one of which is provided with a recess, the other with a vertically-channeled staple-guide, an anvil, and a spring, so that when the jaws are separated after driving a staple the guide will be open for the reception of the succeeding staple, substantially as described.

4. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess, and the other with staple-guiding grooves and an anvil fitted thereto, in combination with a knob to receive the blow of the hand and insert a staple by a sudden percussion, substantially as described.

5. In a staple-inserting machine constructed to operate substantially as described, the staple-guiding block B, having staple-holding grooves C C, forming side extensions of the vertical slot S, substantially as shown and described.

6. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess, and the other with staple-guiding grooves and an anvil fitted therein, the said jaws being arranged to be separated and stand apart to admit the requisite manipulation for conveniently placing a staple in the open end of the staple-guiding grooves, substantially as set forth.

7. The combination of the stationary staple-support or anvil A′ with the sliding guide B, grooved to partially embrace and guide the staple legs, substantially as and for the purpose set forth.

8. In an implement for inserting metallic staples, a reciprocating driver provided with a knob to receive the blow of the hand, in combination with a grooved staple-guiding block and an anvil

attached to a stand of convenient form for use upon a writing-desk, the said stand having an arm rising therefrom, and over and above it a guide for the purpose of guiding the said driver to the said anvil, substantially as and for the purpose set forth.

HENRY R. HEYL.

Witnesses:
P. O'DONNELL,
F. L. ROEPKE.

49 COMPL'TS' EXHIBIT COPY OF ASSIGNMENT OF HENRY R. HEYL TO GEORGE W. HEYL.

To all whom it may concern:

In consideration of the sum of five hundred dollars to me in hand paid by George W. Heyl, of Philadelphia, Pennsylvania, I do hereby sell and assign to the said George W. Heyl all my right, title, and interest in and to the letters patent of the United States No. 195,603, for an improvement in "devices for inserting metallic staples," granted to me September 25th, 1877, the said patent, together with all right- granted thereby, to be held and enjoyed by the said George W. Heyl, his heirs, executors, or assigns, to the full end of the term for which said letters patent are granted, as fully and entirely as the same would have been held and enjoyed by me if this sale and assignment had not been made.

Witness my hand this 20th day of March, A. D. 1878.

HENRY R. HEYL.

Witness:
H. KRUMP.

[Endorsed:] No. 40. Apr. sess., '83. Compl'ts' No. 2. Heysinger *et al. vs.* Crawford. Copy of assignment of Henry R. Heyl to George W. Heyl of letters patent No. 195,603, dated Sept. 25, 1877.

50 COMPLAINANTS' EXHIBIT COPY OF ASSIGNMENT OF GEORGE W. HEYL TO ISAAC W. HEYSINGER *et al.*

Whereas letters patent of the United States, No. 195,603, were on the 25th day of September, A. D. 1877, issued to Henry R. Heyl, of the city of Philadelphia, State of Pennsylvania, for an improvement in devices for inserting metallic staples, and the said Henry R. Heyl, by an instrument of writing dated March 20th, A. D. 1878, and duly recorded in the Patent Office, did sell, assign, and transfer unto George W. Heyl, of Canton, in the State of Ohio, all his right, title, and interest in and to said letters patent and invention; and whereas the said letters patent were reissued, which reissue is numbered 9803 and bears date July 12th, A. D. 1881, and the full right, title, and interest in said reissue is vested in the said George W. Heyl; and

Whereas Isaac W. Heysinger, of the city of Philadelphia, State of Pennsylvania, Christian H. Hershey, of the same city and State, and J. Loren Heysinger, of Lower Providence, county of Mont-

gomery and State last aforesaid, doing business in said city of Philadelphia under the style of "The Philadelphia Novelty Manufacturing Company," and desirous of acquiring an interest therein:

Now, in consideration of the sum of one dollar and other good and sufficient considerations to me paid, the receipt whereof is hereby acknowledged, I, the said Geo. W. Heyl, have sold, assigned, and transferred, and do hereby sell, assign, and transfer, unto
51 the said Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger all my right, title, and interest in and to the said letters patent and invention, the same to be held and enjoyed by them and their legal representatives (subject to the conditions hereinafter mentioned) to the full end of the term for which said letters patent are granted, as fully and entirely as the same would have been held and enjoyed by me had this assignment and sale not been made.

In consideration of the foregoing assignment the said Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, for themselves and their legal representatives, hereby agree as follows:

1. That they will make full and true returns to the said George W. Heyl, or his legal representatives, on the first days of January, April, July, and October in each and every year of all the said patented devices made and sold by them during the three calender months then last past.

2. That they will pay to him, the said Geo. W. Heyl, or his legal representatives, at the city of Philadelphia aforesaid, the sum of three dollars and sixty cents ($3.60) upon each and every gross of the said patented articles made and sold by them, the whole amounts for each quarterly term as mentioned in the foregoing clause to be due and payable within one calender month after the stated return day for that quarter; and they agree that for each and every year after the year 1881 they will pay to the
52 said Geo. W. Heyl a total sum of at least two hundred dollars ($200) although they should not make and sell a sufficient number of said patented articles to amount to that sum per annum at the rate of three dollars and sixty cents per gross, as aforesaid.

It is, however, understood that this agreement shall not be construed to relate to or include what are known as the "novelty paper fastener" now or heretofore made or which may henceforth be made by the said Heysingers and said Hershey, such as are described in letters patent No. 226,402, granted to said Isaac W. Heysinger on the 13th day of April, A. D. 1880.

3. Upon failure of the said Heysingers and said Hershey to make returns and payments, as hereinbefore mentioned, for thirty days after the stated times mentioned, then the full right, title, and interest in and to the said letters patent for the remainder of the term thereof shall revert back to the said George W. Heyl or his legal representatives with the same effect thenceforth as if the foregoing assignment had not been made:

Provided, however, That the said George W. Heyl or his legal representatives shall have first given ten days' notice in writing to

the said Heysingers and said Hershey or their legal representatives of his intention to claim the reversion herein provided in case the terms of this agreement shall not be complied with.

53 4. The said Heysingers and said Hershey agree to defend the said letters patent to the best of their ability and to pay all costs and expenses of suits relating therein.

In witness whereof the parties have hereunto set their hands and seals this twenty-third day of November, A. D. one thousand eight hundred and eighty-one.

GEO. W. HEYL. [L. S.]
ISAAC W. HEYSINGER. [L. S.]
C. H. HERSHEY. [L. S.]
J. L. HEYSINGER. [L. S.]

In presence of—
H. L. HEYL,
CHAS. W. MARTIN,
Witnesses for Geo. W. Heyl.
M. B. FENNINGER,
T. W. RICE,
Witnesses for I. W. Heysinger, Christian H. Hershey, J Loren Heysinger.

53½ [Endorsed:] No. 40. Apr. sess., '83. C. C. U. S. Compl'ts' No. 3. Heysinger *et al.* vs. Crawford. Copy of assignment of Geo. W. Heyl to Isaac W. Heysinger *et al.* Reissue pat. No. 9803.

54 *Complainant's Exhibit License.*

(2–175.)

3879.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of an instrument of writing executed by George W. Heyl *et al.* February 7, 1881, recorded in Liber Q 26, page 464. Said record has been carefully compared with the original and is a correct transcript thereof.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 12th day of March, in the year of our Lord one thousand eight hundred and eighty-three, and of the Independence of the United States the one hundred and seventh.

[Seal Patent Office, United States of America.]

E. M. MARBLE,
Commissioner.

55 Liber Q 26, p. 464.

This agreement, made the seventh day of February, A. D. one thousand eight hundred and eighty-one, by and between George W.

Heyl, of Canton, in the State of Ohio (late of Philadelphia), hereinafter termed the licenser, and Isaac W. Heysinger, and Christian H. Hershey, of the said city of Philadelphia, and John Lorin Heysinger, of Lower Providence, Montgomery county, Pennsylvania, doing business in said Philadelphia as the Philadelphia Novelty Manufacturing Company, hereinafter termed the licensees, witnesseth: That whereas letters patent of the United States No. 193,603 were, on the 25th day of September, A. D. 1877, granted to Henry R. Heyl, of said Philadelphia, for an improvement in devices for inserting metallic staples, and the said Henry R. Heyl did sell and assign to the said licenser all his, said Henry R. Heyl's, right, title, and interest in and to said letters patent and invention, which assignment, dated March 20th, 1878, is duly recorded at the Patent Office and the full right, title, and interest in said letters patent and invention is now owned by the said licenser; and

56 Whereas the said licensees are desirous of making and vending devices substantially such as are described and claimed in and by said letters patent—

Now, therefore, the parties have agreed, and by these presents do agree, as follows:

1st. The licenser hereby grants unto the licensees, their heirs, assigns, and successors, the sole and exclusive right to manufacture and sell said patented improvements upon the terms and conditions hereinafter mentioned.

2nd. There is excepted from this license the right to make or use said invention in combination with other devices as a steam-power book-stitching machine.

3rd. The licensees agree to make full and true returns to the licenser or his legal representatives on the first days of April, July, October, and January in each year of all the said patented devices made and sold by them during the three calendar months then last past.

4th. The licensees agree to pay to the licenser or his legal representatives, at the city of Philadelphia aforesaid, the sum of three dollars and sixty cents ($3.60) as a license fee or royalty upon

57 each and every gross of the said patented articles made and sold by them, the whole of said royalties for each quarterly term of three months, as before specified, to be due and payable within one calendar month after the regular return day for that quarter; and the licensees agree that for each and every year after the year 1881 whilst they shall hold this license they will pay to the licenser a total of royalties of at least two hundred dollars, even though they should not make and sell a sufficient number of said patented articles to amount to that sum, at the regular royalty of three dollars and sixty cents per gross.

5th. Upon failure of said licensees to make returns or to make payments of license fees, as herein provided, for thirty days after the days named, the licenser may terminate this license by serving written notice upon the licensees.

6th. The licensees agree to defend the said letters patent to the best of their ability, and to pay all costs and expenses of suits relat-

ing thereto, and in order to facilitate such proceedings as
58 shall be found necessary to adopt the licenser hereby authorizes and requests the said Henry R. Heyl to agree to assist said licensees in making application for and procuring any reissue or reissues of said patent which, in the opinion of the said licensees, may be necessary and proper: Provided, however, That the licensees shall bear all the costs and expenses of procuring such reissue or reissues.

7th. The licenser hereby acknowledges the receipt from the licensees of the sum of one hundred dollars paid to him in advance and on account of such royalties as may become due under this license.

In witness whereof the parties have hereunto set their hands and seals this seventh day of February, A. D. 1881.

GEO. W. HEYL. [L. S.]
ISAAC W. HEYSINGER. [L. S.]
C. H. HERSHEY. [L. S.]
J. L. HEYSINGER. [L. S.]

Witnesses as to G. W. Heyl:
G. W. HIGHMAN.
A. E. HEYL.
As to licensees:
M. B. FLEMINGER.
ELLA T. HEYSINGER.

Recorded Ap'l 18, 1881.
Ex'd: C. F., E. L. R.

[Endorsed:] License. Compl'ts' No. 4. 3897 D. '83.

59 *Respondent's Testimony.*

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sess., 1883.

ISAAC W. HEYSINGER *et al.* *vs.* JAMES P. CRAWFORD. } No. 40.

Proofs taken on behalf of the respondent before Francis S. Brown, examiner, at the offices of Hector T. Fenton, Esq., respondent's solicitor, No. 905 Walnut street, Philadelphia, pursuant to notice.

TUESDAY, *September* 25, 1883.

Present: Joshua Pusey, Esq., solicitor for complainants; H. T. Fenton, Esq., solicitor for respondent.

Mr. Fenton offers in evidence copy of original letters patent No. 195,603, dated September 25, 1877, to Henry R. Heyl for improvement in devices for inserting metallic staples, marked Defendant's Exhibit No. 1.

Also certified copy of file and contents in the matter of the application for letters patent No. 195,603, marked Defendant's Exhibit No. 2.

60 Also certified copy of file and contents in the matter of the application for the reissued letters patent in suit No. 9803, dated July 12, 1881, marked Defendant's Exhibit No. 3.

Also copies of the following letters patent mentioned in the answer and offered principally to show the state of the art:

41180, January 5, 1864, to D. M. Smyth, marked Defendant's Exhibit No. 4.

56884, August 7, 1866, to A. C. Betts, marked Defendant's Exhibit No. 5.

132,221, October 15, 1872, to J. Tomlinson, marked Defendant's Exhibit No. 6.

67665, August 13, 1867, G. W. McGill, marked Defendant's Exhibit No. 7.

78079, May 19, 1868, to Esser & Steere, marked Defendant's Exhibit No. 8.

120,903, November 7, 1871, to H. C. Bradford, marked Defendant's Exhibit No. 9.

WILLIAM J. BROWN, Jr., a witness called on behalf of the defendant, being duly affirmed and examined by Mr. FENTON, says:

Q. 1. What is your name, age, residence, and occupation?

A. 1. Name, William J. Brown, Jr.; age, 42; residence, 1811 North Twentieth street; occupation, manager of the business of J. P. Crawford.

Q. 2. Have you any experience in the construction and operation of devices for inserting and clinching metallic staples?

A. 2. Yes; I have had practical knowledge of the manufacture of such devices for six years.

Q. 3. Have you taken any patents on such devices, and are you familiar with the state of the art?

61 A. 3. I have, and am quite familiar with the state of the art. During the past six years I have been for a large portion of my time occupied as a machinist, and I am fairly familiar with the subject of mechanics.

Q. 4. Please look at Exhibits Nos. 4 to 9, both inclusive, and say whether you understand the same.

A. 4. I think I understand them all, but I am not so familiar with the last two.

Q. 5. Please look at the two patents, Exhibits Nos. 8 and 9, and say if you find in them shown and described a recessed anvil or clinching base for bending and clinching on the under side of fabric the ends or legs of a button.

A. 5. Each of these patents show a recessed clinching block.

Mr. Fenton offers in evidence the following prior patents set forth in the answer to show priority of invention:

132,078, October 8, 1872, to Heyl & Brehmer, marked Exhibit No. 10.

175,457, March 28, 1876, to H. R. Heyl, marked Exhibit No. 11.

183,670, October 24, 1876, to H. R. Heyl, marked Exhibit No. 12.

191,426, May 29, 1877, to Heyl & Brehmer, marked Exhibit No. 13.

187,189, February 6, 1877, to J. C. Smyth, marked Exhibit No. 14.

Q. 6. Please look at the patent, Exhibit No. 10, and say if you find therein a device for simultaneously inserting and clinching a metallic staple in paper stock by a sharp stroke as contradistinguished from mere pressure.

A. 6. I do.

Q. 7. Do you find in that patent that the wire staple is held
62 in a groove within the punch 72 of the patent in which latter is a sliding hammer operated by a spring, 78, to drive the staple by a blow upon its crown through the paper stock?

A. 7. I do.

Q. 8. What mechanism do you find described in that patent to directly effect the clinching of the staple legs?

A. 8. I find lugs which, by rotation towards each other, bend the ends of the staple together or towards each other.

Q. 9. Please look at the patent, Exhibit No. 11, and say if you find therein a device for simultaneously driving and clinching metallic staples in paper stock by a percussive movement.

A. 9. Yes.

Q. 10. Do you find that in that machine, as described in that patent, a metallic staple is inserted in the paper by means of a hammer sliding in a guiding tube?

A. 10. I do.

Q. 11. Will you please look at the patent and say what mechanism is used to directly effect the clinching of the staple?

A. 11. There appear to be three methods described—one where nippers are employed, as illustrated by figure 10 in the drawings, and another where two movable jaws are used, rotated on the ends of two shafts, and a third, by means of clinch slides sliding towards each other, as shown in figures 11 and 12.

Q. 12. Look at figure 10, at the parts marked 15, and say if that figure represents those parts as clinchers in a state of rest after the staple is driven and before it is clinched.

A. 12. They do.

Q. 13. Looking again at figure 10, at the clincher cams, marked 15, do you not find that they form, when in a position shown in that drawing, inclined sides against which the staple legs are driven and operating to a certain extent to bend the same?

A. 13. They do.

Q. 14. Please look at the patent, Exhibit No. 12, and say if
63 you find therein a device for simultaneously inserting and clinching metallic staples.

A. 14. I do.

Q. 15. Do you find that in that machine the staple is driven by a hammer sliding in the grooves of a metal plate, in which grooves the staple is mechanically placed, the hammer being operated by a cam motion?

A. 15. Yes; I understand that machine thoroughly. I have set them up and given instructions upon them.

Q. 16. What mechanism do you find described in that patent for bending and clinching the staple legs?

A. 16. I find in figure 5 of the drawings shown movable clinchers, which, when at rest, are in position so that the surfaces of the jaws will receive the ends of the staples as they protrude through the paper against their inclined sides. Figure 5 shows the clinchers when at rest, and by the specification, "so that as the legs of the staple project through the book, and enter the slotted plate N, they may also pass between the clincher plates, bear against their inclined faces, and be slightly turned inward, as shown in Figure 5."

Q. 17. Have you read the Heyl reissued patent, in suit in this case, and are you familiar with the device therein shown and described?

A. 17. Yes, sir.

Q. 18. As between the clincher plate as shown in a state of rest in figure 5 of Exhibit No. 12 and the recessed clinching base of the Heyl reissued patent in suit is or is not the first bending of the staple legs performed substantially in the same manner and by the same means in both?

A. 18. It is.

Q. 19. Please state whether or not both of these machines are said in the respective patents to require additional means to finally clinch the staple beyond those stated in my last question.

64 A. 19. They do both require additional means, as stated in the patent, Exhibit No. 11, by means of a movement together of the clinching plates, and in the Heyl reissue "the same may be further flattened down by a second blow between flat surfaces."

Q. 20. In your opinion as an expert in such machines is it necessary to us, any additional means beyond a concave or slanting recess in a metal base to fully and effectually clinch the staple legs if the recess is of the proper diameter and curvature to suit the staple used?

A. 20. The decree of clinch obtained by a cavity depends altogether upon the form of the cavity.

Q. 21. Then I understand you to mean that as between a solid clinching base of a concave recess properly formed for the purpose and two movable clinchers presenting inclined surfaces in a state of rest the difference of result obtained is simply a difference of the degree of clinch. Is that correct?

A. 21. That is so.

Q. 22. In a clinching base having a recess with inclined or curved sides what part of the recess performs the function of bending the staple legs? State fully.

A. 22. It is that particular part on the clinching surface first impinged upon by the staple legs as they protrude from the work or paper, and the legs are inclined towards each other more and more as each successive atom of the staple leg is presented to that spot in the cavity.

Q. 23. Then, if I understand you correctly, a recessed clinching base having curved or slanting sides such as shown in the Heyl reissued patent would work equally as well to clinch the staple if a

round hole was drilled into the base of the recess slightly less in diameter than the points where the staple legs strike the curved or inclined side. Is that so?

(Question objected to as suggesting the answer to the witness.)

A. 23. I should think it would have the same effect.

Q. 24. Have you demonstrated that by actual experiment?

65 A. 24. I have, many times, with tools made by both plaintiff and defendant.

Q. 25. Please look at the letters patent, Exhibit No. 13, and say if you find therein a device for simultaneously inserting and clinching metallic staples in paper stock.

A. 25. Yes.

Q. 26. Do you find in that patent that the staple is inserted in the paper by means of a staple driver moving in a groove driven by a cam?

A. 26. I do. I know this machine very well, and am superintendent of the company which makes and sells them.

Q. 27. Do you find that figure 5 of that patent represents the clinching mechanism?

A. 27. I do.

Q. 28. Do you find, by reference to figure 5 of that patent and the specification describing the same, that the clincher plates in a state of rest are in the position shown in that figure?

A. 28. I do.

Q. 29. In the position there shown do they not form a concave recess, or the substantial equivalent of it, for bending the staple?

A. 29. They do.

Q. 30. And does not the patent describe that in their movement, after the staple is inserted, they finally form a flat surface for the purpose of finally flattening the staple legs against the under side of the material?

A. 30. It does so describe and that is their action.

Q. 31. Please look again at figure 5 of the patent, Exhibit No. 13, and say whether or not it describes a slotted plate, 67, placed immediately over the clinchers, which slot is countersunk at its ends; and, if so, please read from that patent the effect of the countersinks in the slots on the staple legs.

A. 31. It does so describe a plate and its effects upon the staple legs. I quote from the patent: "Which plate acts as a sup-

66 port for the binding tapes or bands and signatures against the thrust of the staple, the legs of which, coming directly opposite the countersinks, are guided by them with certainty into the slots."

Q. 32. Is it necsssary, in your opinion as an expert, that the recess of the clinching base should be round, as shown in the Heyl reissued patent, or would it not operate on the same principle if it was in the shape of a slotted recess of a slotted plate countersunk at its ends, in which the staple legs should come in contact with the countersinks, the slot being of the size of the crown of the staple?

A. 32. I see no difference in effect.

Q. 33. Please look at the letters patent of J. C. Smyth, Exhibit No. 14, and say if you find therein a device for simultaneously inserting and clinching metallic staples in paper stock.

A. 33. Yes; I find that a device for that purpose.

Q. 34. Do you find in that patent mechanism for driving a staple consisting of a head block, *d*, containing a plunger working in a channel in the head block, in which channel a metallic staple is inserted and forced into paper stock by means of a downward movement of the plunger?

A. 34. I do.

Q. 35. Do you find operating in combination therewith any and what mechanism for clinching staple legs on the under side of the paper stock?

A. 35. I do find such mechanism and it consists of a die or anvil, *m*, on the end of the arm 6, the anvil supporting the paper and having a recessed clinching face, which operates, as the patent says, "so that the ends of the — are bent by sliding down the inclined surface."

Q. 36. Is there, or not, any difference whatever between the recessed die or anvil *m* of Exhibit 14 and the recessed clinching driver of the Heyl reissued patent, either in construction, mode of operation, or result produced?

67 A. 36. There is none that I can discover.

Q. 37. Are they or not identical?

A. 37. They are.

Q. 38. In Exhibit 14 do you not find that the recessed die *m* forms part of an arm, 6, made movable so as to successively support the paper tightly against the driving mechanism and afterward to be moved to release the same, substantially as the arm G E in figure 5 of the Heyl reissued patent?

A. 38. I should say they are exactly similar.

Q. 39. In the Heyl machine, as shown in the plaintiffs' reissued patent, figure 5, would the spring D be necessary if the driving mechanism were on the upper arm and the clinching anvil on the base of the machine?

A. 39. No; it would not be necessary.

Q. 40. Is this illustrated in the plaintiffs' device, the Novelty tool, Exhibit C?

A. 40. Yes, which contains no spring in the driver, as shown in this exhibit.

Q. 41. Please look at this Smyth patent, Exhibit No. 14, and state if you find any substantial difference in construction, mode of operation, and result produced between the driving mechanism therein shown, consisting of the channeled head block and plunger *i*, and that of the sliding guide block B, fitted to the anvil A by a sliding joint and having grooves C C constituting the staple-inserting mechanism of the plaintiffs' reissued patent.

A. 41. I don't see any difference.

Q. 42. Do you or not find these parts of the Smyth machine last mentioned, in connection with the clinging anvil *m* of that device, in precisely the same combination and operating in the same way

and for the same purpose as the said parts are found in the Heyl reissued patent?

A. 42. I find them working the same, producing the same result, and operating in just the same combination.

Q. 43. Do you find, in addition to this combination, in the
68 Smyth machine mechanism for automatically inserting the staple in the channel guide of the head block?

A. 43. Yes; I find a device for collecting, arranging, and delivering the staples to the staple channel of the head block.

Q. 44. Does this automatic feeding device change, alter, or in any way affect the operation of the staple driving and clinching mechanism referred to in the 41st question and therein compared with the Heyl device?

A. 44. No; it does not.

Q. 45. Does it operate in any way whatever than to simply automatically place each staple singly and successively in the staple channel instead of putting the staple there by hand, as in the Heyl device?

A. 45. No; it does not.

Q. 46. If the automatic staple feeding device was removed from the Smyth machine could the staple be inserted by hand in the staple channel of the guide block *d*, and with equal facility, as the staple is inserted in the guide block B of the Heyl machine?

A. 46. It could be inserted by hand, but according to these drawings I would say it could not be inserted with quite as much facility.

Adjourned to September 26, 1883, 2 p. m.

WEDNESDAY, *September* 26, 1883—2 p. m.

Present: Joshua Pusey, Esq., solicitor for complainants; Hector T. Fenton, Esq., solicitor for respondent.

Q. 47. Please look again at the drawings in this patent and say why such a staple could not be therein inserted by hand with as much facility, either from the base of the machine or from the side, when the arm C is removed.

A. 47. In examining this patent yesterday I did not ex-
69 amine it as carefully as I should. I say now that I believe the staples could be inserted in the staple way with about the same facility as they could in the machine illustrated in the Heyl reissue.

Q. 48. At either place mentioned in my last question?

A. 48. I would say from the rear instead of the side.

Q. 49. Please look at the Smyth patent, Exhibit No. 14, and say whether or not the plate *s* and thumb screw *t* in any way whatever affect the operation with the driving and clinching mechanism or act other than to afford a firm foundation for the anvil die and to adapt the machine to different thicknesses of books or papers.

A. 49. The plate *s* and the screw *t* do not in the least affect the inserting and clinching of the staple, except so far as that they form together a support for the die *m*. The office of the plate *s* is to afford

a means also of adjustment to different thicknesses of books when operated on by the screw *t*.

Q. 50. In the Smyth machine, Exhibit No. 14, are or are not the staples inserted singly and successively in the channel of the guide block?

A. 50. They are.

Q. 51. Will you please state very briefly how this is affected by means of the automatic feeding device, viz., the spring *k* and the holder *c*?

A. 51. The staples slide down the inclined holder *c* until singly they arrive in the channel of the head block and rest against the spring *k* under the driver.

Q. 52. Have any, and, if so, about how many, letters patent of the United States been granted between the date of the Heyl original patent and the date of the reissue thereof for staple driving and clinching devices that did not infringe the original patent, but which have been claimed by the plaintiffs to be within the claims of the reissue?

(Objected to as immaterial and that the witness is not
70 competent to judge whether or not any such patents did or did not infringe the Heyl patents.)

A. 52. I don't remember just how many, but there are a number, notably among which were several patents to Geo. W. McGill, in 1878 and 1879, and D. M. Somers, in 1878.

Q. 53. Please look at these patents I now show you and say if they or any of them come within the terms of the last question.

A. 53. I look at the patents and say yes as to patent of Daniel M. Somers, No. 200,774, February 26, 1878; patent of Geo. W. McGill, No. 212,316, February 18, 1879; patent of M. Toumlin, No. 267,283, November 7, 1882; patent of Geo. W. McGill, No. 220,934, October 28, 1879; also patent to Isaac W. Heysinger, No. 226,402, April 13, 1880; patent of Isaac W. Heysinger, No. 274,941, April 3, 1883. I have indistinct recollection of others as well as those mentioned.

Mr. Fenton offers in evidence the patents mentioned by the witness, and they are marked as follows:

Patent	226,402, Heysinger, April 13, 1880,	Exhibit	No. 15.
"	274,941, Heysinger, April 3, 1883,	"	No. 16.
"	220,934, G. W. McGill, Oct. 28, 1879,	"	No. 17.
"	267,283, M. Toumlin, Nov. 7, 1882,	"	No. 18.
"	212,316, G. W. McGill, Feb. 18, 1879,	"	No. 19.
"	200,774, D. M. Somers, Feb. 26, 1878,	"	No. 20.

(The introduction of these patents in evidence is objected to as being immaterial to the issue in the case.)

Q. 54. Please look at McGill's patent of October 28, 1879, Exhibit No. 17, and say if there is any substantial difference except in degree of clinch between the slotted clinching anvil therein shown and the countersunk slotted plate of the patent No. 183,670, Exhibit No. 12, about which you testified yesterday.

A. 54. I do not find any difference except in degree of clinch.

71 I might add that in both cases the slot serves to direct the points of the staple in a direct line towards each other.

Q. 55. What is the purpose and object of the reciprocating driver provided with a knob, G, as it is shown and described in the plaintiffs' reissued patent?

A. 55. The purpose is to clinch the staple more or less; this is the clinching part of the mechanism. Its end E contains the recessed anvil or clincher.

Q. 56. In the defendant's "Victor" tool is there any clinching anvil that is reciprocating?

A. 56. No, sir.

Q. 57. Please look at the Victor tool, Plaintiffs' Exhibit A, and say whether or not the lower portion of the clinching base, apart from the guide arm fixed thereto, differs in any substantial or material respect in construction, mode of operation, and result produced from the recessed clinching base or anvil referred to and described in the several patents prior to the date of the Heyl original, and about which you testified yesterday.

A. 57. It does not.

Q. 58. Please look at the staple driving device, being part of the Plaintiffs' Exhibit A, and say whether or not, in so far as respects the combination of driver, tube, and staple channel, it differs in any material or substantial respect from the same parts in combination for driving the staple, which you pointed out yesterday, in the prior patent of Tomlinson, Exhibit No. 6, and the other prior patents, Nos. 10 to 14, inclusive.

A. 58. It does not.

Q. 59. Exhibit A is in two parts—one the clinching device referred to in the fifty-seventh question; the other the staple-driving device referred to in the fifty-eighth question. Can the latter be used without the former?

A. 59. It can.

Q. 60. Please refer me to an instance in any of the prior patents mentioned in my fifty-third question.

72 A. 60. Tomlinson's patent, Exhibit No. 6.

Q. 61. Are these parts united together in this Exhibit A, viz., a clinching base and staple driver?

A. 61. No; they are not united.

Cross-examined by Mr. PUSEY:

X Q. 62. You are the patentee of the patents under which the "Victor" tool, Exhibit A, is made?

A. 62. I am.

X Q. 63. The defendant, J. P. Crawford, is a licensee under one or both of these patents, is he not?

A. 63. He is a licensee under one of these patents and owns the other.

X Q. 64. Is J. P. Crawford, for whom you are the manager, as mentioned in the answer to the first interrogatory, the defendant in this case?

A. 64. He is.

X Q. 65. When did your knowledge or experience or both with regard to tools for inserting metallic staples commence?

A. 65. My knowledge of tools for that purpose was first obtained some time during 1875. My experience actively began in September, or thereabouts, of 1877.

X Q. 66. Did you ever have any experience in or in the manufacture of such implements previous to your acquaintance with Henry R. Heyl, the patentee of the complainants' implement?

A. 66. No, sir.

X Q. 67. How long have you been acquainted with the state of the art as shown in the several patents upon which you were examined by Mr. Fenton?

A. 67. I began examining the state of the art soon after my connection first with Mr. Heyl, which was some time in 1876.

X Q. 68. When did you first become familiar with the patents—I mean all of them—referred to in my last question?

A. 68. The knowledge of those patents has been gained by
73 degrees and at various intervals, as occasion arose, extending through all the time since 1876.

X Q. 69. When did you first become acquainted with the Smyth patent, Exhibit No. 14?

A. 69. I first knew of it in 1876 or 1877, soon after it was allowed. I was not entirely familiar with it at that time, however, not then being interested in the manufacture of any similar devices.

X Q. 70. When did you next examine that patent?

A. 70. I don't think I examined it at all afterward until last year or, perhaps, eighteen months ago, at a time when I was defendant in a suit brought by these complainants.

X Q. 71. You at one time made implements for inserting and clinching staples in which the staple driver, which is separate from the clinching base in the "Victor" tool, Exhibit A, was fastened by means of a front plate secured by screws, did you not?

A. 71. I did.

X Q. 72. Then the only substantial difference between that tool and the "Victor" tool, so far as the staple inserting and clinching mechanism are concerned, consists merely in that the driving mechanism is detached; am I right?

A. 72. That is all the difference that I recognize at present.

X Q. 73. If you invert the staple-driving part—that is, the case and plunger of the "Victor" tool and the clinching block, and place the knob upon the upper side of the clinching block, then insert a staple in the staple channel and place the staple guide in the recess or opening of the clinching base and strike smartly upon the knob, will not the clinching of the staple legs be thereby effected substantially as shown and described in the Heyl reissue?

A. 73. Yes; certainly.

X Q. 74. Then the "Victor" tool, so far as operation is concerned, is simply an inversion of the parts of the machine described and shown in the Heyl reissue?

74 A. 74. No; it is not.

X Q. 75. Explain the difference.

A. 75. The difference is the "Victor" tool is composed of two separate parts; one the clinching anvil, with the base adapted only for resting upon a flat surface, and the other part an entirely distinct and separate tool for the purpose of driving staples only.

X Q. 76. Then I infer that if the driving part were fastened to the arm of the clinching base in such a case there would be an inversion of the Heyl tool?

A. 76. If it were fastened to the arm it would be practically an inversion of the Heyl tool according to the reissued patent.

X Q. 77. Do you know of any tool previous to the invention by you of the "Victor" tool in which the driving device and the clinching part are made separate?

A. 77. No, sir.

X Q. 78. Please examine figure 5 of the Heyl reissue and state whether or not the driving mechanism and the clinching mechanism are made separate and pivoted opposite each other.

A. 78. Figure 5 of this reissued patent is a complete tool. It is not a tool in any practical form in any of its parts without being all connected together.

X Q. 79. Cross-question No 78 repeated and witness is asked to answer the question directly.

A. 79. There is only one way to answer that question. It is obvious that the parts must be made first separate in the process of construction and must be assembled together, as shown in this drawing, before being operative.

X Q. 80. In figure 5 does not the pivoting of the parts together merely cause the one to be directed to the other and against it so as to guide the staple legs into the clinching recess?

A. 80. That is the intention of it.

X Q. 81. And such is only the function thereof, is it not?

75 A. 81. No; there are other functions performed by this pivoted member.

X Q. 82. Please state the other functions.

A. 82. One is that that part of the machine may always be in a proper position over its proper point of contact with the work, and it also has a flat surface upon which the legs of the staple may be flattened down upon the work after they have been more or less imperfectly clinched.

X Q. 83. Does not the arm which is pivoted on the clinching base of the "Victor" tool perform the same function, so far as directing the driver to the clinching recess is concerned, as in the Heyl tool?

A. 83. It does not.

X Q. 84. Explain wherein the difference as to this point consists.

A. 84. In the "Victor" tool the arm projecting over the clinching cavity guides the staple-driving tool to its proper place over the clinching cavity, while in the figure 5 of the reissued Heyl patent the arm carries on its end a clinching cavity and directs it to its place for clinching.

X Q. 85. That is, in one case the clinching recess is directed over

the staple-driving part and in the other case the staple-driving part is directed over the clinching recess?

A. 85. Yes.

X Q. 86. If the arms in the Heyl reissue were disconnected the parts would not be directed properly towards each other or against each other, would they?

A. 86. With no certainty, but they might be. There would be no guide.

X Q. 87. Would not the same condition exist if the vibrating arm of the "Victor" tool were disconnected?

A. 87. Yes.

X Q. 88. If the vibrating arm of figure 5 of the Heyl reissue were disconnected would not the remaining part—that is, the staple-
76 driving part—be useful or capable of use for driving staples into material, such as wood, paper, or other similar yielding substance, instead of against the clinching recess?

A. 88. You could drive a staple with it with more or less inconvenience, but it would not be a useful tool.

X Q. 89. Why not?

A. 89. Owing to its specific construction the parts that would remain would be extremely awkward to use.

X Q. 90. In what way would they be awkward to use?

A. 90. All the projections on the lower part of that tool would be in the way.

X Q. 91. What projections do you refer to?

A. 91. The trunnions at the rear end of the block or base would, in some of the uses suggested, be too high to permit the staple-driving block to come into proper contact with the surface, and, by the necessary construction of the machine, according to its original design, these trunnions must be of that height.

X Q. 92. Then you consider that a certain height of the trunnions is a necessary part of the machine, do you?

A. 92. They were as originally designed.

X Q. 93. Please examine carefully figures 1, 2, and 3 of the Heyl reissue and state if the staple case and plunger or anvil, with or without the elevating spring D, do not constitute a staple driving and inserting device.

A. 93. They do under some conditions.

X Q. 94. How are they attached in those figures to the base?

A. 94. There is a post, indicated at *a* in figures 1 and 2, on which the case slides, and the staple rests upon its back on the top of the post in grooves in C C of the case, with the legs pointing up, and the work to be fastened is pressed down upon the case, which retreats under the pressure and allows the work to impale itself on the legs of the staple.

77 X Q. 95. Do you not find that the parts referred to in my previous question are secured to the base or arm by means of a screw?

A. 95. The post *a* referred to is secured by means of a screw in the drawing, but the block is not secured.

X Q. 96. If this screw be taken out and these parts thus detached,

and of suitable size, wherein would their operation as a staple driver differ substantially from that of the implement shown and described in the Tomlinson patent of 1872, in evidence in this case?

A. 96. These parts, if unsecured and prepared as described, would not be the same parts.

X Q. 97. What securing and preparation do you refer to?

A. 97. That which was referred to in the question.

X Q. 98. In these parts as thus detached is there not in combination one part adapted to hold and guide the staple and another part capable of driving the staple thus held and guided?

A. 98. There is a part for holding and guiding the staple and there is a part for resisting the pressure of the crown of the staple against any pressure brought upon the stable legs.

X Q. 99. If the part for resisting the pressure of the crown of the staple, as you have stated, be struck a blow whilst the staple is inserted in the guiding and holding part will not the staple be driven into a yielding material against which the face of the said guide is placed?

A. 99. If the conditions are favorable for striking that way it would.

X Q. 100. If a Tomlinson driver of suitable size were screwed by its plunger against the base, open end up, as is the detachable driver and case of the Heyl implement, and fitted thereto, would it not operate precisely similar to the like parts of the Heyl tool, figures 1, 2, 3, and 5 of the patent drawings?

A. 100. Of the proper size, it would when secured.

X Q. 101. Wherein does the substantial construction and
78 operation of the Tomlinson tool differ from that of the driver of the Victor tool, Exhibit A, if at all?

A. 101. It is constructed differently. There are specific features in it that are peculiar, which I can allude to more freely by reference to the patent, but they both will drive staples.

X Q. 102. Then I infer that the differences are merely as to details of construction and not as to principles of operation?

A. 102. Yes.

X Q. 103. Then, since all are detachable and are combinable, are they not substantially equivalent if used in like manner?

A. 103. I don't understand what is meant by "they all" in your question.

X Q. 104. I refer to the Tomlinson driver, the "Victor" driver, and the parts detached of the Heyl tool, in my 93d, 94th, 95th, and 96th cross-questions.

A. 104. Certainly they are.

X Q. 105. Please examine the Smyth patent, Exhibit No. 14, and point out the desk, table, or platform upon which the machine rests.

A. 105. It is not described in the specification or lettered on the drawing to identify it, but there is here what seems to be an illustration of a wooden support for the machine as drawn.

X Q. 106. Do you not find that a part of the machine projects through and below that support?

A. 106. I find a screw projecting through an opening in what appears to be the support of the machine.

X Q. 107. Then, if that board (support) be considered the top of the desk or table, is it not necessary, in order that the tool be properly supported thereby, that a hole be cut through such support?

A. 107. It need not be, because the machine might have been raised up by other supports placed on top of the table so that the screw would clear the surface.

79 X Q. 108. Is it not shown in the drawing thus cut away and without such supports as you refer to?

A. 108. If the support mentioned in former answer is properly such, which I have no means of knowing, it would appear as if an opening had been cut through it.

X Q. 109. Is it not necessary in the operations of the machine to reach the screw *t* by the hand underneath?

A 109. Yes; I should say so.

X Q. 110. Then, is the Smyth machine as shown, adapted for use, to be set upon tables, desks, &c., as a desk or office tool, without mutilation of the top of the desk, &c.?

A. 110. As shown in the drawing of the patent, it is not well adapted; but there would be no mechanical difficulty in the way of making it perfectly adaptable by a simple addition of some depth of base of the machine itself, which is a mere question of making the castings that way.

X Q. 111. How, in such case, could the screw *t* be practically reached?

A. 111. Perfectly practicable to so leave an opening in the casting of the base that the screw can be readily reached by the hand.

X Q. 112. Do you know whether this has been done in fact?

A. 112. I do not know.

X Q. 113. Have you ever seen one of these Smyth machines?

A. 113. I have.

X 114. In actual use?

A. 114. I have not seen them in actual use but once, but I know of a number of them that are in use at the present time, binding pamphlets—at least, I judge so, from the fact that I have recently received orders to furnish staples for the same.

X Q. 115. Where and when have you seen one of these machines in actual use?

A. 115. I saw one in use in the bindery of William Knoepe, at Eleventh and Spruce streets, New York city, about the fifteenth day of September of the present year.

80 X Q. 116. Was that machine constructed as shown in Smyth's patent?

A. 116. I did not examine the machine particularly and therefore cannot give a definite answer.

X Q. 117. For what purpose was that machine being used?

A. 117. It was being used for stitching pamphlets.

X Q. 118. It is, then, a machine adapted for use in binding books in book-binderies and permanently attached to a table or platform.

A. 118. I believe that is the way the machine was used. I did not examine it at all.

X Q. 119. Was it run by power or by hand?

A. 119. My impression is that this machine was run by power, but I could not swear to it.

Adjourned to Thursday, September 27, 1883, 2 p. m.

THURSDAY, *September* 27, 1883—2 p. m.

Present: Joshua Pusey, Esq., solicitor for complainant; Hector T. Fenton, Esq., solicitor for respondent.

X Q. 120. The function of the screw *t* in the Smyth patent, Exhibit No. 14, is to adjust the machine for books of different thicknesses?

A. 120. I should think that was the purpose for which it was used. It does not effect any other purpose.

X Q. 121. If that screw be removed from the machine could the machine be of practical use for its purposes?

A. 121. Yes.

X Q. 122. Explain how that is.

A. 122. The screw *t* acts as a support for a lever marked *s* and operates to raise or lower that lever or arm, but the said lever or arm might be adjusted by other means, and so the screw
81 could be dispensed with and the object of the machine, which is to drive and clinch staples in books or other material, be perfectly well served, as the screw has nothing whatever to do with the driving or clinching of staples, necessarily.

X Q. 123. As the machine is shown in the Smyth patent, is not the screw *t* necessary in order to adjust the machine for driving and clinching staples in different thicknesses of books or pamphlets?

A. 123. It is a useful but not necessary means of adjustment. It has nothing whatever to do with the insertion and clinching of staples.

X Q. 124. If, then, a staple is driven through a book of a certain thickness, and the screw *t* is afterwards removed and a book of the same thickness is to be stapled, can the machine operate in the latter case successfully?

A. 124. No; it would not operate the same way. Something would have to be placed under the die *m* or the die *m* would have to be placed upon something solid to retain it in the same position in which it was when the first operation was performed as described in the question. Any other thing instead of the screw which would retain it thus in position would serve a like purpose in driving and clinching the staple.

X Q. 125. Then, when different thicknesses of material are to be stapled together, it is necessary to adjust the screw *t* accordingly as the thickness varies?

A. 125. It is necessary to adjust something rigid under the die *m* at a proper point to accommodate the thickness of the book or material; that something in this case, as shown in the drawings, is an arm adjusted by this screw.

X Q. 126. Do you find the adjustable screw *t* in the Heyl reissue?

A. 126. No, sir; but I find its equivalent.

X Q. 127. What is that equivalent?

A. 127. Its equivalent is found in the swinging arm containing the clinching anvil, which in that patent is suspended over the work or book instead of being under, and therefore is capable
82 of being raised to any point sufficiently high to permit any thickness required to interpose between it and the staple-inserting mechanism, and its equivalent adjustment is found in that fact.

X Q. 128. The number of papers—that is, the aggregate thickness of the papers to be stapled together—is constantly varying in the general and in office practice and would not a stapling machine requiring adjustment have to be in general use adjusted very frequently?

A. 128. Yes, sir; it would; but in this Smyth patent, which is under consideration, it is possible to have the clinching die supported in such a manner that it would be automatically adjustable, and so do away with the screw or other positively rigid means of support and make it thoroughly practical for the insertion and clinching of staples in work varying in thickness. The rigid devices which are adjustable in this drawing of the Smyth patent, by means of a screw to support the clinching die at certain varying points, are in nowise a part of the driving and clinching of the staple.

X Q. 129. Does not the Heyl implement instantaneously adjust itself by the mere closing of the driving and clinching jaws to any thickness of paper or varying thicknesses of paper?

A. 129. Yes, sir.

X Q. 130. But the Smyth machine does not thus adjust itself to the varying thicknesses of paper—that is, the machine as shown in the drawings of the Smyth patents?

A. 130. No; it does not.

X Q. 131. Is not such automatic adjustability a very material advantage for miscellaneous work?

A. 131. Yes; I think it is; but it is entirely unnecessary as a part of driving and clinching staples.

X Q. 132. Is it not a fact that the action of raising the driver of the Smyth machine allows the staple to drop into the barrel
83 or staple channel from the side, and that when said driver is raised the staple is placed beneath it, if the tool be supplied with the staples as required for use?

A. 132. Yes.

X Q. 133. There is a wedge, *s*, which is drawn back by the raising of the lever h^1 at its rear end to lift the die plate *m* against the material to be stapled and the bottom of the staple case, is there not?

A. 133. The question, as put, hardly describes the action of the wedge plate, but I understand its action to be that the wedge plate *s* is moved endwise by an arm, h^2, from the lever h^1 that is linked to said plate *s*, so that the latter slides endwise as the lever h^1 is raised and depressed; and, again, the wedge-plate *s* is moved endwise to

raise the die *m* and press the book or pamphlet firmly up against the lower edge of the head block *d* and hold the same while the plunger drives the staple and the ends thereof are turned up against the said die *m*.

X Q. 134. This hard compression of the material is stated in the specification of the Smyth patent to be necessary in order to make a staple drive and clinch successfully, is it not?

A. 134. It is so stated here.

X Q. 135. Now, having a pile of papers ready for stapling, the driver being raised, and the staple in place under the driver, how can you practically know, in using the Smyth machine, how far up to screw the screw *t* to make this necessary compression without putting the papers under the staple case, bringing down the driver to draw back the wedge plate *s* into place and then screwing the screw *t* up to the proper tension; and, if you do this, will not the staple be projeccted into the material beneath by mere guess-work at the same time whether you wish it or not?

(Question objected to as tending to mislead the witness by use of a term which at times is applied to a movable driver or plunger and at other times to a stationary head block.)

84 A. 135. I should not raise the driver or plunger high enough to admit of the staple coming under it, but should raise it as high only as may be necessary, so that the wedge plate *s* is moved endwise sufficiently to allow the die *m* to drop and place thereon the book desired to be fastened. I should then bring down the driver without a staple to the book, at the same time turning the screw *t* back or forth, as the case may be, until the book is compressed between the die plate *m* and the end of the head block *d*. Experience would soon teach any one to do this expeditiously.

X Q. 136. That is, you would go through the complete operation of driving the staple and adjusting the screw, except that you would not raise the plunger quite high enough?

A. 136. That is what I would do if I expected to use the same length of staple that might at that time be suspended on the inclined bar *c*, but in practice it rarely or never occurs that the same staple in length of leg can be successfully used to bind two different thicknesses of books or materials, and it would be ordinarily necessary to remove the staples from the machine entirely and replace them with staples of a proper length for the work about to be done, and after the removal of the first staples mentioned the machine would be capable of being manipulated in the process of adjustment by a full stroke of the lever *h* backwards, which would raise the driver or plunger to its full height, as in the operation of driving staples, and thus no particular ingenuity would be required to effect the adjustment for the new work to be done, as there would be no danger of bringing down a staple in that operation.

X Q. 137. These operations would require some time, would they not?

A. 137. They would require a little time, undoubtedly.

X Q. 138. And would require some nicety or care, would they not?

A. 138. As the answer to that question is a matter of opinion, I can state that from experience in the use of other machines
85 which are very similar to the machine described in the Smyth patent that the inventor of that machine was mistaken about the necessity of firmly clamping to the work or book to the degree that he describes, and I have found that there is a good deal of scope possible in that particular. I have found that it is not necessary to clamp the book firmly; it is only necessary to bring the jaws of the end of the driving apparatus to the surface of the book or material to be fastened and the driving is equally well performed, provided the under surface of the book is supported sufficiently to resist the pressure of the staple legs. The pressure, if any is wanted, is exerted better by the end of the plunger at about the finishing of the insertion.

X Q. 139. Referring to your answer 136, is there any means shown in the Smyth patent, Exhibit No. 14, by which the self-feeder will feed down staples of various lengths to suit varying thicknesses of material?

A. 139. I am unable to give any opinion about the self-feeding device as shown in the Smyth patent, as to what extent it is capable of performing its work, not having given that part of the device much thought. It, however, is entirely unimportant in considering this question of driving and clinching staples, as it forms no necessary part of the driving and clinching part of the machine.

X Q. 140. Has the length of the staple legs anything to do with the requirement of the Smyth patent, that the die *m* and the material have to be firmly compressed under the head block?

A. 140. I don't think it has anything to do with the proper driving and clinching of the staple, provided the legs are of sufficient length to protrude through the paper so as to allow enough of the end of the staple leg to be bent over by the infringing upon the curved sides of the recrossed channel or cavity of the die *m*.

X Q. 141. The object of the spring *k* in the Smyth patent is to prevent the staple from dropping through before the descent of the driver, is it not?

86 A. 141. I quote from the specification of the Smyth patent: "It is to be understood that as the plunger *i* is drawn up above the staple bar *c*, the spring *k* returns to its position against the ends of the staple bar and supports the lowest of the staples, so that the staples cannot run off the end of the incline," "but are retained so that only one at a time is taken away by the plunger."

X Q. 142. Then, if a similar staple were stuck up into the lower end of the head block—that is, presuming it is possible to do this—the staple would not be retained in the head block?

A. 142. That does not necessarily follow, as a staple may fit the channel so accurately that it would by its own friction remain suspended in the channel and not fall out.

X Q. 143. Is the Smyth machine intended for feeding staples,

crown upwards, at the lower end of the head-block channel and afterwards forcing them out at the same place?

A. 143. Not as shown in this drawing.

X Q. 144. Is the Smyth machine adapted to work practically in that way with staples short enough in the legs to pass through a proper thickness of material and clinch when the material is less in thickness than the thickness of the fingers, when inserted under the head block, to insert the staple from beneath, say $\frac{3}{16}$ to $\frac{1}{4}$ of an inch?

A. 144. As the machine is shown I can form no idea of how much space practically was intended to be left, and can only answer the question by giving an opinion that by the general operation of the machine it would be possible to insert a staple as described from underneath and into the channels of a head block.

X Q. 145. The drop of the die *m* in said machine, by the sliding back of the wedge plate *s*, added to the thickness of the material, gives all the available space for manipulation, does it not?

A. 145. It does.

X Q. 146. If the staples are fed from above every excess of
87 drop of the die *m* throws a proportionately greater work on the lever h^1, does it not? To draw the wedge plate up and raise the die and press it against the under side of the head block, and without any gain whatever, as the staples are fed from above, all the play required being what is required to release and press or jam up the material; is this not so?

A. 146. There is no additional work put upon the lever h^1, whether the work be thick or thin, the office of the lever or the wedge plate being simply to slide endwise with each stroke of the lever h^1, and its motion being exactly alike in either case is not affected in this movement by the fact of the work being thick. The amount of drop of the die *m* is not fixed to any particular necessary point, except by the depth of the depression in which it slides, and this depression can be three or four times as much as would be really necessary without in the least interfering with the operation of driving and clinching staples. There is no indication reliably stated or shown in the patent of the Smyth machine as to how deep this depression should be.

X Q. 147. Would a lift of six inches be made by a wedge as easily as one an eighth of an inch?

A. 147. Yes; under some conditions.

X Q. 148. In the Smyth machine is there any retracting spring to elevate the driver or plunger *i*?

A. 148. There is none shown in the patent.

X Q. 149. Do you find in the Smyth machine any hand knob for driving down the plunger or driver by a blow of the hand?

A. 149. I do not find any proper means of operating the machine by a blow of the hand on a knob, but I find the equivalent device of a lever for working the machine.

X Q. 150. In your opinion would a sudden blow on the head of the plunger by the hand drive the staple in the Smyth machine, at

the same time drawing the large arm h^2 back, pulling the
88 wedge plate s along its bed and raising the die m to compress the paper hard up against the head block all by one sudden percussion of the hand?

A. 150. I have seen hands that might do it, but the lever h^2 and the wedge plate s being disconnected from the lever h^1, inasmuch as they have nothing whatever to do with the object of inserting and clinching a staple, would make it quite possible to drive and clinch a staple by a percussion or blow of the hand.

X Q. 151. In case of such sudden blow of the hand on the head of the plunger of the Smyth machine, as the machine is shown in the patent, would not a great part of the force of the blow be distributed elsewhere on the levers and links instead of being concentrated on the staple alone, as in the Heyl tool?

A. 151. Undoubtedly; but I did not say in my former answer that the staple could be driven and clinched by a blow upon the driver or plunger of the Smyth machine, even under the favorable conditions I described in the last part of my answer, as easily as one could be so inserted and clinched; but if the Smyth machine were divested of these levers, and a knob placed upon the end of the plunger, the work could be as effectively and as easily performed as by means of the Heyl machine represented in the reissued patent.

X Q. 152. What do you understand a hand stamp to be?

A. 152. Primarily, I would understand it to mean all machines or devices for any purpose where a blow of the hand is intended to effect the object to be accomplished by the machine, and they are made with knobs for that purpose, to receive the blow of the hand; but sometimes it has been the case that machines, such as seal presses notably, have been characterized in the trade or by the dealers in them or manufacturers of them as hand stamps. Such machines as latterly mentioned operate by means of a thrust when impelled by the hand pressing on the lever.

X Q. 153. Did you ever see described in any letters patent or know of any machine previous to the date of the Heyl
89 original patent, Exhibit No. 1, which combines in itself the elements of a staple driving and clinching tool with the recessed clinching block and staple channel to hold and guide the staple and plunger or anvil to force them through the interposed paper and bend their legs over in the clinching recess which was made in the form of a hand stamp for general use in offices on desks and for miscellaneous uses of lawyers, writers, and others of like occupation?

A. 153. To all that part of the question ending with the words "clinching recess" I say: Yes; I did; as to the purposes for which these machines might be adapted the state of the art has shown largely the extent to which the application has been expanded.

X Q. 154. My question was an entire one and could be answered as a whole, but you have separated it and answered a part of it only. Please answer it as a whole.

A. 154. It did not seem to me possible for me to give a short answer to the question. I have answered the first part and will now

answer the last. I believe the device of H. R. Heyl was the first one that I saw which would come under the description strictly of a machine with a knob; but, technically, it was not the only machine that possessed the characteristics capable of making it a hand stamp.

Adjourned to Friday, September 28, 1883, 2 p. m.

FRIDAY, *September* 28, 1883—2 p. m.

Present: Joshua Pusey, Esq., solicitor for complainant; Hector T. Fenton, Esq., solicitor for respondent.

X Q. 155. The "Victor" tool, Exhibit A, has a spring for retracting the staple driver in the case. Is not that spring performing that function of considerable advantage?

90 A. 155. It is of some advantage to recover the driver or plunger, but not at all necessary to the driving of staples. It could be dispensed with without serious detriment to the effectiveness of the tool, as is illustrated by the Complainant's Exhibit C.

X Q. 156. If such spring is not used the driver would have to be retracted by the hand, would it not?

A. 156. Not necessarily; it might be retracted by simply inverting the tool, when it would retract by its own weight.

X Q. 157. That is, if made loose enough in the case?

A. 157. It must be loose enough in the case to work easily; and if loose enough for that would ordinarily be loose enough to drop back if the tool were inverted.

X Q 158. Could not the spring D be dispensed with equally well in the Heyl tool, or Exhibit B, as in the Novelty, whether inverted or not, if it be desirable to do so?

A. 158. No; because the spring D in the Heyl reissue is used to support the block in position, and in such a manner that a sufficient opening will be left above the driver or float in which to insert the staple, and if not so placed and used, or if the block were used without a spring, it would be necessary to hold up the block with the fingers while it was being charged with a staple, and then, unless the staple itself fitted tight enough to bind in the channel, and thus form a support for the block, the block would drop away and the staple would be thrown out entirely before the material to be fastened could be placed on the driver block

X. Q. 159. As the subject-matter of your last answer does not apply to the "Victor" tool, why, then, is the spring used in that tool for retracting?

A. 159. Because in the making of tools of that cheap description more or less error or fault of dies or other conditions may make slight differences in the channel or in the plunger, and occasionally some might be produced that would not work so freely as to

91 permit them to recover by their own weight if said tools were inverted, but principally because the impressions given to buyers of the tools without a spring would not be as captivating as with a spring, and as everything in the sale of such articles depends largely on the first impressions given the spring was added.

X Q. 160. If the spring were dispensed with and the plunger be made to fit loosely within the case, and the gravity of the plunger and its driving head or knob be depended upon to retract the driver by inversion, would not, after the staple is inserted and the driver inverted in the act of preparing to drive the staple—would not the same gravity of the driver and its knob be apt to force out the staple?

A. 160. It would tend that way.

X Q. 161. It would appear by your answers to X Q. 155 and 156 that the driver of Exhibit C operates to retract itself by gravity when inverted; is that what you meant?

A. 161. I did not say that the driver of Exhibit C would so act if the tool were inverted; I said it might be made to do so. The driver of Exhibit C does not so act in the model shown to me; it is held by friction.

X Q. 162. You have stated in answer to Q. 39 that the spring D, figure 5, of the Heyl reissue would not be necessary if the driving mechanism were on the upper arm and the clinching anvil on the base of the machine; is not the retracting spring also advantageous in that it affords a resistance to the thrust in the act of inserting the staple by the fingers into the staple channel?

A. 162. The spring D in the position described in the question may be deemed advantageous by some, but is not necessary to the successful insertion of the staple in the channel, as is evidenced by Exhibit D, in which the parts that perform the driving and clinching of the staple are all shown in an inverted form without the presence of any spring. In that device the driver or plunger is raised either by the act of inserting the staple in the channel, which
92 act raises the driver, or the driver is drawn back by the hand and so held while the staple is being placed in the channel. In that device the spring is preferably dispensed with, because its presence there would interfere with the operation of flattening down the staple legs by the second process described in the original patent as necessary to a completion of the clinch after the staple legs have been partially clinched in the cavity. This flattening down of the staple legs is accomplished between the two faces respectively of the staple case and the stationary anvil containing the clinching cavity or slot.

X Q. 163. Have you known of any staple driving and clinching tools, operating by hand, since the date of the Heyl invention, in which such retracting springs were not used, except Exhibits C and D?

A. 163. I have.

X Q. 164. When, where, and what?

A. 164. I misunderstood the former question, 163. I alluded in my last answer to Exhibit C, which I did not know was included.

X Q. 165. Question 163 repeated.

A. 165. I have not.

X Q. 166. Referring now to the general tenor of your testimony, in which you speak of the equivalence of the machine described in the Smyth patent, Exhibit 14, to the Heyl machine, have you meant

to say that if the hand-adjusting screw *t*, of the former patent, the levers and connecting links, and the entire self-feeding device, and the wedge plate *s* were removed, and the die plate *m* be made self-adjusting, and a hand knob and retracting spring be added—that is to say, if certain of the operative parts of the Smyth machine were removed and others added, that the machine would then operate like the Heyl implement?

A. 166. I mean to say that if all those parts of the machine described in the Smyth patent, Exhibit 14, which do not have anything to do with the process of driving and clinching
93 staples, including the levers and connecting links, the self-feeding device, wedge plate, were removed, and the die plate *m*, self-adjusting, and a knob placed on the plunger, either with or without a spring under the knob to raise the driver or plunger, it would be operative to produce the same result as that produced by the hand stamp shown in the reissued Heyl patent, and that if the Smith machine also were provided with a pivot upon which the arm could rotate or vibrate, in addition to the changes above mentioned, it would also be identical with the machine shown in the Heyl patent, and produce the exact result produced by that machine; and, also, if the Smyth Exhibit No. 14 were reversed, with the base of the machine removed, and the knob placed on the die *m*, and if the upper end of the plunger were secured to a firm base, and a staple inserted in the head block, and the arm of the said machine left as it is shown in the drawings of that patent, it would operate by percussion upon the knob secured to the die plate *m* to insert and clinch a staple equally as well as is done by the implement shown in the Heyl reissued patent.

X Q. 167. You have stated in answer to X Q. 116 that you have never seen but one of the Smyth machines, and that machine you did not examine. Did you notice it sufficiently to observe whether it was made as shown in the Smyth patent, or whether it had alterations, additions, or improvements thereto?

A. 167. As I before stated, I did not closely examine the Smyth machine particularly referred to; my impression is, however, that I noticed one alteration which would make it differ from the drawings of Exhibit 14 in respect to the feeding device, but that is all I can state from knowledge or impressions. I have seen more than one Smyth machine, but I have not seen more than one in operation.

X Q. 168. Looking at the drawings of the Smyth patent, do you not find that the arm h^2 is pivoted to the rear part of the arm h^1, and that the said arm h^2 is connected to the wedge plate *s* by
94 means of a link, and also that the rear part of the plate *s* appears to rest upon the base of the machine? Is that your understanding of it?

A. 168. That is the general impression conveyed by the drawing. The specification says: "Beneath the die *m* there is a wedge plate, *s*, that is moved endwise by an arm, h^2, from the lever h^1 that is linked to said plate *s*, so that the latter slides endwise as the lever h^1 is raised and depressed." * * * "As the plunger rises the wedge plate *s* is moved endwise, bringing the thinner part of said plate beneath the

said die *m*." It has occurred to me repeatedly in the examination of this patent drawing that in this particular the drawings and specification are incomplete. It is evident that a motion like that described needs one more addition to make this movement as described certain, and that addition can be legitimately made to the device without changing any other part of the machine. As a working model was supplied to the Patent Office, together with the application, it is fair to presume that the model itself was operated, and in all my deductions in my former testimony I have had this point in view, recognizing that it was no doubt an oversight.

X Q. 169. Then, in your opinion, I would infer, as the specification and drawings of the Smyth patent now stand, a machine made in strict accordance therewith would be inoperative for the purpose described in the patent?

A. 169. No; I do not understand that it would be inoperative either as a whole or in part, the object of the machine being to insert and clinch metallic staples in books or other material, although it might not operate precisely as described in the said patent. It might be made effective for the very same purposes described, notwithstanding.

X Q. 170. Would it be operative so far as the wedge plate *s* and its connections are concerned?

A. 170. It would; although the wedge plate *s* could not be persuaded to make any endwise movement to speak of. The wedge plate *s* in that case would form the base for the clincher die at whatever point it were adjusted.

95 Re-examination by Mr. FENTON:

Q. 171. Referring to your last three answers, is there, in your opinion, anything omitted to be described in the Smyth specification to make the wedge plate operate with certainty, as you say, that would not be suggested to any mechanic in constructing a machine under that patent?

A. 171. There is not.

Q. 172. So far as respects all that portion of the Smyth machine that is actually necessary to drive and clinch a staple simultaneously, do or do not the drawings of that patent show and the specification describe a complete and operative combination of parts for that purpose?

A. 172. They do.

Q. 173. Is not the action of the automatic-feeding appendage of the Smyth machine such, and such only, that as the plunger is raised after driving the staple the next staple drops into the channel groove in the same position as though it were placed there by hand in the side of the machine?

A. 173. It is.

Q. 174. After the automatic feed puts a staple in the channel groove of the Smyth machine is there any difference in the subsequent operation of driving and clinching between this machine and that described in the plaintiffs' reissued patent?

A. 174. There is none.

Q. 175. Under the same conditions, is there any difference between them in the number and character of the elements and in their combination for that purpose, aside from the retracting spring?

A. 175. There is no difference between the elements of the two devices.

Q. 176. Please answer the same question except that part relating to the retracting spring and substituting for the device shown in the reissued patent, the Plaintiffs' Exhibit D, which Mr. Heyl in his testimony claims to be another form of his patented device.

96 A. 176. There is none.

Q. 177. In Exhibit D you find the clincher and driver reversed from the position of those parts, as shown in the patent? Could the parts be reversed in the Smyth machine?

A. 177. Yes; they could so far as the inserting and clinching devices are concerned, and, indeed, also, if necessary, the feeding devices.

Q. 178. In the Heyl machine you have said, in answer to Mr. Pusey, that the adjustment of distance apart between the opposite jaws to admit the papers is effected by making the arm containing the clinching anvil, shown therein, as an upper arm. Now, in the Smyth machine, is not the adjustment of distance apart of the clincher and driver to admit the papers effected by means of a similar movable arm, containing the clinching anvil, but shown in this case as a lower arm?

A. 178. The adjustment is so effected in the Smyth patent.

Q. 179. Is there any mechanical difference involved in reversing the parts of the Heyl machine, making the clinching anvil the lower part and the staple-driver the upper part, instead of *vice versa*, as shown in the drawing?

A. 179. No.

Q. 180. In the Smyth machine the head block in which the plunger moves is stationary, and the driver moves in it against the crown of the staple, as in the plaintiff's reissued patent. Is not that so?

A. 180. Yes.

Q. 181. In the Smyth machine the head block in which the staple driver moves is shown in the drawing as stationary and forming a part of the arm or standard d^1. Is not that so?

A. 181. That is so.

Q. 182. That being so, would its operation of driving and clinching a staple be different in mode of operation and result if the standard d^1, of which the head block d is a part, was pivoted at the base of the machine, as shown in McGill's patent, Exhibit No. 19, instead of being stationary?

97 A. 182. No.

Q. 183. Could it be so pivoted, in your opinion?

A. 183. It could.

Q. 184. May or may not both jaws in such a machine be made movable for the purpose of adjusting their distance apart in operation, and for illustration of my meaning I refer you to the form shown on sheet 1 of McGill's patent, Exhibit No. 17?

A. 184. Both jaws can be made movable, or one only, without changing the result obtained, including the adjustment as well as the inserting and clinching of the staple. This patent, Exhibit No. 17, shows it in the form of plyers.

Q. 185. In cross-question 148 you were asked if there were any retracting spring in the Smyth machine? Is any such necessary to simultaneously drive and clinch a staple, and do you find any such in the plaintiff's "Novelty" tool, Exhibit C, or in Mr. Heyl's Exhibit D?

A. 185. The retracting spring is not necessary to simultaneously drive and clinch a staple, nor do I find any such spring in Exhibit C or D.

Q. 186. In answer to Mr. Pusey's question, No. 171, you stated that you had at one time made a tool in which the staple-driver "was fastened by means of a front plate secured by screws." Please say what machine you referred to.

A. 186. I referred to a machine which is substantially illustrated in a tool known as "Brown's Single Blow Binder," and one of the identical machines is an "Exhibit" in a former suit brought against me by the plaintiffs in this case; I will furnish one of those machines (which will be marked "Exhibit No. 21").

Q. 187. Can you refer me to any of the exhibits in evidence here, in which the clinching base is attached to a movable arm and reciprocates on a spring placed beneath it?

A. 187. I can; and I refer you to the patent of Daniel M.
98 Somers, Exhibit No. 20, figures 5 and 10; the arm is shown in figure 2; this affords a means of adjustment.

WILLIAM J. BROWN, JR.

Sworn and subscribed before me this twenty-eighth day of September, A. D. 1883.

FRANCIS S. BROWN, *Examiner.*

Mr. Fenton, on behalf of the respondent, offers in evidence letters patent of the United States to J. S. Palmer, No. 90382, dated May 25, 1869, being the letters patent referred to by the patentee, Heyl, in the application for the reissued letters patent in suit, marked "Exhibit No. 22."

Also letters patent of the United States No. 218,227, dated August 5, 1879, to William J. Brown, Jr., marked Exhibit No. 23.

Also assignment of the last-mentioned patent of William J. Brown, Jr., to J. P. Crawford, respondent in this suit, dated November 21, 1882, marked Exhibit No. 24.

Also letters patent of the United States No. 260,365, granted to William J. Brown, Jr., dated July 4, 1882, marked Exhibit No. 25.

JAMES P. CRAWFORD, a witness called on behalf of the respondent, being duly sworn and examined by Mr. FENTON, says:

Q. 1. State your name, age, and residence; and are you defendant in this suit?

A. 1. James P. Crawford; age, forty-four; residence, No. 1748 Sydenham street, Philadelphia; and I am defendant in this suit.

Q. 2. Does the Plaintiffs' Exhibit A, "Victor" tool, correctly represent the staple-inserting tool and the staple-clinching tool
99 which you have for a few months prior to the bringing of this suit and since then been engaged in manufacturing and selling?

A. 2. It does.

Q. 3. Have you been and are you now, manufacturing and selling those tools, Exhibit A, under and by virtue of any, and, if so, what letters patent of the United States?

A. 3. I have, under letters patent Exhibits Nos. 24 and 25.

Q. 4. Do you still retain the ownership of patent, Exhibit No. 24?

A. I do.

Q. 5. Do you own, or have you a license under or any interest in, the other patent referred to by you, marked Exhibit No. 25?

A. 5. I manufacture that machine under a verbal license from Mrs. Brown.

Q. 6. Are you a practical mechanic, and do you understand letters patent and machinery, in the sense of being familiar with such subjects?

A. 6. I am not a mechanic at all, and am not versed in the patent business.

Q. 7. Will you please state whether or not the staple-driver and the clinching-tool, Exhibit A, are made by you in strict accordance with those two letters patent, Exhibits 24 and 25, respectively, and intended to be so, so far as you understand the drawings and specifications of those two patents?

A. 7. Yes; they are.

Cross-examined by Mr. PUSEY:

X Q. 8. When did you commence the business of manufacturing these articles?

A. 8. I was interested in the manufacture of them in the early part of 1882—about first of the year; and after that, as owner and proprietor, from about the time of the date of the assignment mentioned, or previous to that, somewhat.

100 X Q. 9. Were you aware, when you were first interested in the business, of a decree against the witness, William J. Brown, Jr., in the suit brought by these complainants on the Heyl reissued patent upon which the present suit is brought?

(Objected to as not cross-examination.)

A. 9. When I was first partially interested there was no decree, but I knew of that decree about the time it was granted.

X Q. 10. What is your occupation?

A. 10. Travelling salesman.

J. P. CRAWFORD.

Sworn and subscribed before me this 28th day of September, A. D. 1883.

FRANCIS S. BROWN, *Examiner.*

Respondents close.

101 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper and contents in the matter of the reissue letters patent granted Henry R. Heyl, assignor to George W. Heyl, July 12, 1881, number 9803, for device for inserting metallic staples.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 22d day of September, in the year of our Lord one thousand eight hundred and eighty-three, and of the Independence of the United States the one hundred and eighth.

[SEAL.] E. M. MARBLE,
Commissioner.

PHILADELPHIA, PA., *May* 10, 1881.

Hon. Com'r of Patents, Washington, D. C.

SIR: I enclose herewith—

1. Specification.
2. Drawing.
3. Certified copy original patent.
4. Abstract of title.
5. Oath of loss of letters patent.

The whole forming an application of Henry R. Heyl for reissue of his letters patent No. 195,603, dated September 25th, 1877.

Your ob't serv't, ISAAC W. HEYSINGER,
Attorney for Applicant, 1433 *Girard Avenue*,
Philadelphia, Pa.

U. S. Patent Office, May 10, 1881.

102 To the Commissioner of Patents:

Your petitioner, of Philadelphia, Pennsylvania, prays that he may be allowed to surrender the letters patent for an improvement in devices for inserting metallic staples granted to him September 25th, 1877, whereof George W. Heyl, on whose behalf and with whose consent this application is made, is sole owner by assignment, and that letters patent may be reissued to the said George W. Heyl for the same invention upon the annexed amended specification; and your petitioner hereby appoints Isaac W. Heysinger, of Philadelphia, State of Pennsylvania, his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith. Accompanying this petition is an abstract of title, duly certified, as required in such cases.

$30. H. Old pat. abst. dr'g.

HENRY R. HEYL.

The undersigned, assignee of the entire interest in the above-mentioned letters patent, hereby assents to the accompanying application and power of attorney.

GEO. W. HEYL.

[To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in paper fasteners, which improvement is fully set forth in the following specification and accompanying drawings, in which Figs. 1 and 5 are side elevations of the fastener embodying my invention; Fig. 2 is a vertical section in line *x x*, Fig. 1; Fig. 3 is a side elevation, partly sectional; Fig. 4 is a horizontal section in line *y y*, Fig. 1.

Cancelled by sub-spec. (a), May 12, 1881.

Similar letters of reference indicate corresponding parts in the several figures.

103 My invention consists of an implement of the form of a hand stamp, by which metallic staples may be forced through sheets of paper documents and secured by clinching the legs upon the reverse side.

The tool may be concisely described as a hand stamp for simultaneously inserting and bending over the ends of metallic staples by a sudden blow or percussion of the hand upon a knob provided therefor, [the staples thus being shot or, as mechanics say, jumped into place] and the ends brought together in a manner impossible in many cases, where a light metal staple is employed, to be accomplished by simple continued pressure when the layers of stock to be united offer much resistance. It is provided with two jaws, one of which reciprocates with reference to the other, [one] (the upper) jaw being provided with a recess with concave or slanting ends for bending the staple legs together and the other with a grooved staple channel, R, into which the staples [are inserted] singly at the open end thereof and afterwards projected therefrom by a [driving head] [or] anvil operating in the said staple channel when the jaws are brought suddenly together by a blow of the hand upon the knob [attached to the upper jaw.] of the stamp. A retracting spring operates to keep the staple channel open for the insertion of a staple when the hand is removed from the knob.

Fig. 5 shows the form in which I usually manufacture the tool, Fig. 1 being a modification thereof, the invention being capable of other modifications in the arrangement of parts, the essentials being the recessed bending block in one jaw with staple-guiding block and a driving head operating therein in the other, together with an impact head or knob to receive the blow of the hand.

In the form shown at Fig. 5, which is cheaply constructed and

104 gives satisfactory results, the [vibrating lever] (driver) E G is pivoted at the rear end thereof and closes down upon the base (anvil) A when struck by the hand upon the knob G. In this form the recessed bending block is shown in the upper jaw and the staple-guiding block and driving head in the lower one, but I do not confine myself to the

specific arrangement of the different parts thereof. It is evident that the tool shown at Fig. 5 may be inverted without materially affecting the operation thereof.

At Fig. 4 is seen an end view of the staple-guiding block, B, containing within it the vertical staple channel C C, along the middle of the rear side of which is an open vertical slot, S, so that the staple, when in place, is only partially embraced by the said staple-guiding block B. It will also be observed that the vertical grooves C C at the sides of the staple channel, in which the legs of the staple run, and which guide the staple and retain it in the same vertical plane, are widened from front to rear in their central portion so as to form an enlarged vertical chamber within the body of the block B; so that the tool is adapted to either insert a simple wire staple, such as is shown in Fig. 6, or one with an expanded or ornamental head, or a staple provided with a lateral projection or open loop.

The spring D operates so as to change the relative position of the driving head or anvil A^1 and the staple guide B the instant the staple has been driven and bent and the jaws are separated, so that the guide B shall be open to receive the next staple, the vibrating driver lever being sufficiently removed from the lower jaw to admit of the manipulation requisite for the easy insertion of a staple into the staple grooves C C.

The staple-bending recess F (see Figs. 2 and 3) is of any of the ordinary forms used in stapling machines, being provided with concave or slanting ends. It may be cast in the metal, cut with a milling wheel, or formed in any suitable manner. As I show it in different sectional views its long diameter is sufficiently great to receive within its concave or slanting ends the points of the staple, and its greatest depth is from one-fourth to one-third its long diameter at the surface. Its internal form or curvature is comparatively immaterial, provided the ends are sufficiently slanting to deflect the staple legs easily, as the staples are driven or shot into the recess too suddenly to allow them to follow the bottom of the bending recess or to admit of any movement upon the part of the papers being fastened together until the operations of driving and bending, which go on simultaneously, are completed.

The operation of the device is as follows: A staple is placed downward within the grooves C C of the guide B with its crown toward driver bending recess F. The papers to be united are now placed between the jaws, and by a smart blow of the hand upon the *the* driving head A^1, the points thus being directed toward the knob G, the staple legs forced are driven through the papers and into the recess F, where the projecting ends are simultaneously bent over. The hand is now released from the knob of the driver, the latter then rising, and the papers are withdrawn, thus completing the operation.

It will be seen that the grooves C C serve to support and guide the staple legs during their penetration through the papers, and the recess F is so shaped that as the staple legs enter thereinto they will strike the concave or slanting walls of said recess, and thus be bent inward toward each other.

A plate, *a*, may be employed to overlap the staple crown for preventing the latter from bending or buckling while the legs are being forced through the papers.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The staple guide B, driving head A^1 (anvil), operating therein, recessed bending block E (driving), spring D, and knob G, combined and operating substantially as and for the purpose set forth. .

106 2. A staple-inserting implement having two opposite jaws arranged with relation to each other, substantially as shown, one of which jaws is provided with a recessed bending block, the other with a vertically-channeled staple guide, a driving head, and a spring operating to change the relative positions of the driving head and the staple guide upon separation of the said jaws after the insertion and bending of the ends of a staple, so that the guide shall be open for the reception of the succeeding staple, substantially as described.

3. An implement for inserting metallic staples, consisting of two opposite jaws attached to each other, one of which is provided with a staple-bending recess and the other with a staple-guiding channel and driving head fitted therein, in combination with an impact head to receive the blow of the hand and bring the said jaws together by a sudden percussion, substantially as described.

4. The combination of the driving head A^1 (anvil), spring D, reciprocating staple-guiding block B, and the clinching head E F (driver), having a bending slot with inclined ends, substantially as described.

5. In a staple-inserting machine constructed to operate substantially as herein described the staple-guiding grooves C C, opening into the opposite sides of a wide central chamber, substantially as and for the purpose set forth.

Erased by am'd't May 31, 1881.

6. In a staple-inserting machine having two staple-driving and staple-bending jaws attached together and constructed to operate substantially as described, an open vertical slot, S, in the face of the staple-guiding block B, substantially as and for the purpose herein set forth.

Erase and insert (2), am'd't May 31, '81.

7. In a staple-inserting machine constructed to operate substantially as described the staple-guiding block B, adapted to receive and hold a staple and containing mechanism for inserting and bending the ends of the same against and opposite recessed

Erase and insert (3), am'd't May 31, '81.

107

jaw, in combination with a vibrating lever adapted to be raised to and stand in a suitable position for placing the staple in the open end of the said staple-guiding block B, substantially as shown and described.

8. In combination with a pair of hinged arms provided with inserting and clinching jaws, a feathered plunger to drive the staple, a recessed clinching head in the opposite jaw to clinch the same, a staple-guiding block attached to the staple-driving jaw by a spring and provided with grooves to receive, hold, and guide a staple, in which grooves the feathers of the plunger fit and move, all constructed and combined to operate substantially as described.

Erased by am'd't May 31, '81.
Amd't, May 12, '81.

9. The combination of the anvil or driving head A^1 with the reciprocating slotted or recessed hammer operating to insert a staple through layers of stock to be united and simultaneously bend over the projecting ends, substantially as and for the purpose set forth.

Erase am'd't, May 12, 1881.

10. 9. 7. The combination of the stationary staple support or anvil A^1 with the sliding guiding B, grooved to partially embrace and guide the staple legs, substantially as and for the purpose set forth.

Erase am'd't, June 14, '81.

10. 11. As an article of manufacture an implement of the form of a hand stamp having staple driving and bending jaws attached together and provided with an impact knob, by which metallic staples may be forced through sheets of paper documents and secured by clinching the legs upon the reverse side, substantially as described.]*

Erased by am'd't May 31, '81.

(Line 68, the words "are inserted" have been written in before signing.)

HENRY R. HEYL.

Witnesses at signing:
P. O. DONNELL.
F. L. ROEPKE.

108 STATE OF PENNSYLVANIA, }
County of Philadelphia, } ss:

Henry R. Heyl, the above-named petitioner, being duly sworn, deposes and says that he verily believes that his aforesaid letters patent are inoperative by reason of a defective specification, and that such defect consists in the omission of a claim for the open slot in the staple-guiding block B; for the wide middle chamber with narrow side grooves in said staple-guiding block B; for the mechanism for inserting and projecting the staples singly; for the combination

* Words and sentences enclosed in brackets erased in original.

of the essential elements of the invention; for the combination of the parts required for automatically retracting the piston in the block B, and for the general combination of the parts in the form of a hand stamp; that all these were fully shown and employed in the tools which he constructed, and are fully shown in his original patent in the drawings of the same, and were a real and legitimate part of his invention, no claim for which was ever made by the above-named petitioner. Deponent further believes that his patent is invalid by reason of having claimed the double clinching blow mechanism which he has since learned had been previously described and claimed by J. S. Palmer, No. 90383, May 25th, 1869, though in a different combination. The above errors arose by inadvertence, without any fraudulent intent or design to deceive; that George W. Heyl is the sole owner of said letters patent, and that this application is made on the behalf of and with the consent of said George W. Heyl, and that he verily believes himself to be the first and original inventor of the improvement set forth and claimed in this amended specification, and does not believe that the same was ever before known or used.

HENRY R. HEYL.

Sworn to and subscribed before me this 30th day of April, 1881.

P. O. DONNELL, [L. S.]
Notary Public.

109 Reissue appl. Henry R. Heyl. Devices for inserting metallic staples. U. S. Patent Office, May 10, 1881.

STATE OF PENNSYLVANIA, } ss:
County of Philadelphia, }

Henry R. Heyl, of Philadelphia, county of Philadelphia and State of Pennsylvania, being duly sworn, deposes and says that the letters patent of the United States, No. 195,603, granted to him and bearing date the 25th day of September, A. D. 1877, have been lost or destroyed; that he has made diligent search for the same, and that they are not in his possession, nor in the possession of George W. Heyl, assignee of said letters patent; that he has no knowledge of where they are to be found, and does not know that they are in existence.

HENRY R. HEYL.

Subscribed and sworn to before me this seventh day of May, A. D. 1881.

P. O. DONNELL, [L. S.]
Notary Public.

U. S. Patent Office, May 10, 1881.

No. 32879. Reissue. May 10, 1881.

Room No. 95.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *May* 10, 1881.

Henry R. Heyl, care Isaac W. Heysinger, Phila., Pa.:

Attention is called to portions of the specification indicated in pencil which cannot be entertained in view of the original text.

J. P. CHAPMAN, *Ex.*

32879 $\frac{642}{126}$

H. R. Heyl. 2. May 10, 1881.

110 *Abstract of Title to Assignment Division. F. S. Evans. Returned June* 24, 1881.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the digest of this office of all assignments, agreements, licenses, powers of attorney, and other instruments of writing found of record up to and including May 5th, 1881, under or relating to letters patent granted Henry R. Heyl September 25, 1877, No. 195,603, "devices for inserting metallic staples."

In testimony whereof I, V. D. Stockbridge, acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this tenth day of May, in the year of our Lord one thousand eight hundred and eighty-one, and of the Independence of the United States the one hundred and fifth.

[L. S.] V. D. STOCKBRIDGE,
Acting Commissioner.

No other ass'ts found of record up to & including June 21, '81. Slaughter.

111 Assignor.	Assignees.	Date of assignment.	Date of record.	Invention.	Territory assigned.	Liber.	Page.
Decree of the court of common pleas No. 1 for the county of Phila., Pa.	"The Novelty Paper Box Co."	May 20, '75	Mar. 22, '76	Forming and inserting wire staples on paper boxes, and others.	Decree of the court declaring that the name of "The American Paper Box Machine Company" be changed to "The Novelty Paper Box Company."	L 20	49
H. R. Heyl	George W. Heyl, of Phila., Pa.	Mar. 20, '78	Mar. 22, '78	Devices for inserting metallic staples, Sept. 25, '77, No. 195,603.	All his right in said letters patent	N 22	257
Same	William J. Brown, Jr., of Phila., Pa.	Nov. 28, '77	Oct. 15, '78	Same	All his right, title, and interest in said letters patent.	K 23	61
George W. Heyl	Isaac W. Heysinger, Christ'n H. Hershey, of Phila., Pa., and John Loren Heysinger, of Lower Providence, Pa., doing business as the Philadelphia Novelty Manufacturing Company.	Feb. 7, '81.	Ap'l 18, '81	Devices for inserting metallic staples, Sept. 25, '77, No. 195,603.	License of the sole and exclusive right to manufacture and sell said improvement, excepting the right to make or use in combination with other devices, as a steam-power book-stitching machine. For conditions and agreement relative to reissue see record.	Q 26	464
Affidavit of	George W. Heyl, of Canton, Ohio.	Ap'l 22, '81	May 2, '81	Same	Statement of said Heyl that on or about the 20th day of March, 1878, he purchased from Henry R. Heyl all the right, title, and interest in said letters patent; that he was not informed and did not know of any previous assignment of such right and interest or that any person claimed to have such assignment, but that the purchase by deponent was made in good faith.	R 26	184

Patent Office, May 10, 1881, U. S. A.

112 MAY 12, 1881.

Hon. Comm'r Patents.

SIR: In the matter of the application of Henry R. Heyl for improvement in devices for inserting metallic staples (reissue), filed May 11th, 1881, I desire to amend as follows:

Cancel the present specification and the first four claims (1, 2, 3, 4); also the 9th claim (the substance of which is embodied in the new first claim, now submitted); also in the present 8th claim, 3d line, cancel the word "feathered," and substitute for the present specification and first four claims the following:

A. To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in paper fasteners, which improvement is fully set forth in the following specification and accompanying drawings, in which Figs. 1 and 5 are side elevations of the fastener embodying my invention. Fig. 2 is a vertical section in line *x x*, Fig. 1. Fig. 3 is a side elevation, partly sectional. Fig. 4 is a horizontal section in line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of an implement of the form of a hand stamp, by which metallic staples may be forced through sheets of paper or documents and secured by clinching the legs on the reverse side.

Referring to the drawings, A^1 represents a stationary anvil, which is secured to or formed with an arm rising from a suitable stand of convenient form for use upon a writing desk, and B represents a sliding guide block fitted to the anvil A^1 by a sliding joint, and having grooves, C C, which match with the tongue of the anvil, the upper face of the block being flat. The normal position of the guide B is elevated,
113 and in order to keep it in this position or from dropping prematurely I employ a spring, D, which may press up under the guide or a spring, D^1, which may press against it, and thus produce the necessary friction. E represents a reciprocating driver, whose under face is flat, and in the same is a concave recess, F, said driver having a knob, G (said driver having a knob, G), for receiving the blows of the hand and provided with a spring, H, for causing the return or elevation of the driver.

The operation is as follows: A staple is placed within the grooves C C, with its crown resting on the anvil A^1, the points thus being turned toward the bending recess F. The papers to be united are now placed beneath the driver, and by a sharp blow of the hand upon the knob G the driver is forced downward upon the papers. The staple legs come through

the papers into the recess F, where they are bent over by the slanting ends thereof.

It will be seen that the grooves C C serve to support and guide the staple legs during their penetration through the papers, and the recess F is so shaped that as the staple legs enter thereinto they will strike the concave or slanting walls of said recess and thus be bent inward toward each other, as shown in Figs. 2 and 3. A plate, *a*, may be advantageously employed to overlap the staple crown for preventing the latter from bending while the legs are being forced through the papers.

It will be seen that the staple support or anvil A^1 with the slotted or recessed hammer operates to insert a staple through layers of stock to be united and simultaneously bends over its projecting ends.

In my original specification I describe the further separate operation of completely flattening down the ends of the staple thus bent over by a second blow between the upper and lower jaw of the implement, believing that the same was new; but I have since learned that the same result was obtained by devices described in previous letters patent of the United States. Should the legs of the staple, when
114 bent over by the same blow which drives the same, as is hereinabove described, be found not to lie sufficiently close to the surfaces of the paper, the same may be further flattened down by a second blow between flat surfaces in front of the staple channel and bending recess, respectively, provided therefor.

Figures 1, 2, and 3 show a hand stamp embodying my invention, in which the driver reciprocates in a fixed head, in the manner of a plunger, while Fig. 5 shows the same invention embodied in a hand stamp in which the driver is mounted at the end of a vibrating arm, pivoted at its rear extremity to the base, which rests upon the table. It will be seen that the devices which constitute my invention are to be found in both these modifications, and that both operate in precisely the same manner to insert, by a blow upon the knob G of the hand stamp, the staple through layers of stock to be united, and simultaneously bend over the projecting ends in the opposite bending recess provided therefor.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

Am'd't, May 31, '81. Erase and insert (4), am'd't June 14, '81.

[1. The combination of the stationary staple support or anvil A^1 and the sliding staple guide B with the reciprocating slotted or recessed hammer, operating to insert a staple through layers of stock to be united and simultaneously bend over its projecting ends, substantially as and for the purpose set forth.

Am'd't, May 31, '81.

2. In a device for inserting metallic staples the combination of the staple guide B, anvil A^1 operating them, spring D, recess F, and knob G, the whole arranged to operate substantially as and for the purpose described.

3. A staple-inserting implement having two opposite jaws, arranged with relation to each other substantially as shown, one of which jaws is provided with a recess with concave or slanting ends and the other with a chan-

115 Erase and insert (1), am'd't May 31, 1881.

and
neled staple-guiding block, ^ an anvil operating therein, and a spring arranged to change the relative position of the parts when the said jaws are separated after the insertion and bending of the ends of a staple, so that the staple-

will
guiding channel shall be open for the reception of the succeeding staple, substantially as described.

4. An implement for inserting metallic staples consisting of two opposite jaws [attached to each other],* one

Am'd't, May 31, '81.

the
provided with a staple-bending recess and ^ other with a staple-guiding channel, and an anvil fitted thereto to each other in combination with ^ a knob [an impact head]* to receive the blow of the hand and insert a staple ^ [bring the said jaws together]* by a sudden percussion, substantially as described.]*

The present 5th, 6th, 7th, and eighth claims will remain numbered as at present; the 10th will become the new 9th and the 11th will become the new 10th.

Respectfully submitted,

HENRY R. HEYL,
By his attorney, ISAAC W. HEYSINGER,
1433 *Girard Avenue, Philadelphia, Pa.*

32879 642/126

Henry R. Heyl. Sub. spec. May 12, 1881. U. S. Patent Office, May 12, 1881.

116 No. 32879. Reissue. May 10, 1881.

Room No. 95.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *May* 14, 1881.

Henry R. Heyl, care Isaac W. Heysinger, Phila., Pa.:

Upon further consideration of this matter in connection with amended specification, applicant is advised that the 1st clause of

---

* Words and sentences enclosed in brackets erased in original.

claim does not present an operative combination of mechanical device for the purpose stated. It is obvious that without a staple-holding device the parts enumerated would be inoperative, in view of which a staple-holding device should be included. In reference to the 2d and 3d clauses of claim, the statement that the anvil operates in the guide block is unwarranted, inasmuch as the anvil is stationary and the guide block slides up and down upon the anvil. With proper correction as to this point, the 2d and 3d clauses of claim may be allowed. With reference to the 4th clause of claim, the parts referred to as opposite jaws are not in a correct sense attached to each other. The expression attached to each other is correct only in an abstract sense, viz., both are elements held in or mounted in the same frame-work, similar to a steam hammer, one part acting as the hammer and the other as an anvil. The term impact head also seems to render this clause ambiguous, as the several parts are all definitely named and described in the specification. The 5th and 6th clauses are indefinite and unwarranted in view of the description rendered. It is not understood what legitimate connection the grooves have with a wide chamber, such chamber or opening serving to receive the projection of the stationary anvil, as the guide block slides up and down therein. In the 6th clause the words attached together are unwarranted in
117 the sense of reciprocating action; as before stated, they are parts of the same structure only.

The 7th clause is also indefinite and ambiguous and fails to present the elements which applicant has by his invention brought into operative action and which are described definitely in the specification.

The 8th clause is also unwarranted and is not in harmony with the description of the machine. The 10th clause is broad and indefinite and fails to present any definite parts which applicant has invented.

J. P. CHAPMAN, *Ex.*

32879 $\frac{642}{126}$

H. R. Heyl. 1. May 14, 1881.

PHILADELPHIA, PA., *May* 30, 1881.

Hon. Commissioner of Patents, Washington, D. C.

SIR: I have the honor to acknowledge the receipt of a communication from the examiner in the matter of my application for patent for device for inserting metallic staples (reissue), filed May 10th, 1881, dated May 14th.

I should explain that I have been delayed in considering the examiner's suggestions, notwithstanding the urgency of the case in view of legal matters brought against us, because every possible moment had to be given to the fitting out of an expedition to New Mexico, which has just been gotten off.

The suggestions of the examiner in the above-named case are accepted, and I shall now proceed to make the necessary corrections.

In clause 1 of my claim please insert after the words "stationary staple support or anvil A^1" these words: "and the sliding staple guide B."

118 In clause 2 cancel the words "operating therein."

In clause 3 cancel the words "operating to change the relative positions of the anvil and the staple guide upon separation of the said jaws after the insertion and bending of the ends of a staple so that," and substitute therefor the following:

(Cancel.) Am'd't, June 14, '81.

["So as arranged so that when the jaws are separated, after driving a staple."]*

(Insert) 1.

In clause 4 cancel the words "attached to each other," in the third line.

Cancel the words "an impact head" and substitute therefor "a knob."

Cancel the words "bring the said jaws together," and substitute therefor "insert a staple."

Cancel the present 5th clause entirely.

Cancel the present 6th clause and substitute therefor the following new clause, which will thus be numbered 5th in the new series:

Am'd't, June 14, '81.

["In a staple-inserting machine constructed to operate substantially as described the staple-guiding block B having staple-holding grooves C C and an open slot, S, substantially as shown and described."]*

2 (New clause.)

Cancel the 7th clause and substitute therefor the following new clause, which is more definite. As the Heyl machine was the first single-feeding one combined with a clincher, it was the first to allow the introduction of the staple singly and to separate the jaws sufficiently for to allow the staples to be inserted into the staple-guiding grooves. Hence it is important to cover it, more especially as the same was made an important feature in a more recent patent. The new clause I suggest is as follows:

[6. "An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess and the other with staple-guiding grooves and an anvil

Am'd't, June 14, '81. (a.)

119 fitted therein, the said jaws being so arranged as to be separated and stand apart to admit the requisite manipulation for conveniently placing a staple in the open end of the said staple-guiding grooves, substantially as set forth."]*

---

* Words and sentences enclosed in brackets erased in original.

The 9th clause seems to have been allowed; it was a part of the original patent.

Cancel the 8th and the 10th clauses entirely, as I think the remaining ones, if allowed, will be sufficient.

Respectfully submitted.

Your ob't serv't,

HENRY R. HEYL,
By his attorney, ISAAC W. HEYSINGER, *M. D.*,
1433 *Girard Avenue, Philadelphia, Pa.*

32879. 642/126

H. R. Heyl. Am'd't. May 31, 1881. U. S. Patent Office, May 31, 1881.

No. 32879. May 10, 1881.

Room No. 95.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *June* 4, 1881.

Henry R. Heyl, care Isaac W. Heysinger, Phila., Pa.:

Upon further consideration of this matter, in connection with the last amendment, it is obvious that the "recess F" should not form an element of the mechanical combination, as such recess is a provision of the "hammer" referred to in the first clause of claim and such recess is not an operative element independent of such hammer.

In the third clause of claim the words "so," before "arranged," in the new sentence introduced by last amendment, should be stricken out and or substituted; also the word so should be inserted immediately after "arranged," same sentence; also substitute will for "shall," in the 12th line of same clause, so as to read "channel will be open." In the fourth clause of claim the words "fitted to each other" in ^renders the clause indefinite, and it is suggested that such objection may be remedied by substituting thereto for such words. The amended 6th clause may be allowed by inserting, after "slot S," the words adapted to receive a corresponding portion of the anvil. Applicant is requested to furnish a revised copy of claims, in view of their present mutilated condition from the several amendments.

J. P. CHAPMAN, *Ex.*

32879. 642/126

H. R. Heyl. 2. June 4, 1881.

WASHINGTON, D. C., *June* 13, 1881.

Hon. Comm'r of Patents.

SIR: In the application, No. 32879, of Henry R. Heyl for patent (reissue) for improvement in devices for inserting metallic staples,

filed May 10th, 1881, please strike out all the clauses of the present claim and substitute therefor the following:

1. The combination of the stationary staple support or anvil A^1 and the sliding staple guide B with the reciprocating slotted or recessed hammer, operating to insert a staple through layers of stock to be united and simultaneously bend over its projecting ends, substantially as and for the purpose set forth.

4

2. [In a device for inserting metallic staples the combination of the staple guide B, anvil A^1, spring D, and knob G, the whole arranged to operate substantially as and for the purpose described.]*

Erase and insert (5), am'd't June 18, '81.

3. A staple-inserting implement having two opposite jaws, arranged with relation to each other substantially as shown, one of which is provided with a recess, the other with a vertically channeled staple guide, an anvil, and a spring, so that when the jaws are separated after driving a staple the guide will be open for the reception of the succeeding staple, substantially as described.

121

4. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess and the other with staple-guiding grooves and an anvil fitted thereto, in combination with a knob to receive the blow of the hand and insert a staple by a sudden percussion, substantially as described.

5. In a staple-inserting machine constructed to operate substantially as described, the staple-guiding block B having staple-holding grooves C C, forming side extensions of the vertical slot S, substantially as shown and described.

6. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess and the other with staple-guiding grooves and an anvil fitted therein, the said jaws being so arranged as to be separated and stand apart to admit the requisite manipulation for conveniently placing a staple in the open end of the said staple-guiding grooves, substantially as set forth.

I. W. H.

7. The combination of the stationary staple support or anvil A^1 with the sliding guide B, grooved to partially embrace and guide the staple legs, substantially as and for the purpose set forth.

I. W. H.

8. In an implement for inserting metallic staples a reciprocating driver provided with a knob to receive the blow of the hand in combination with a grooved staple-guiding block and an anvil attached to a stand of convenient form for use upon a writing desk, the said stand having an arm rising therefrom and over and above it a guide for

122

*Words and sentences enclosed in brackets erased in original.

the purpose of guiding the said driver to the said anvil, substantially as and for the purpose set forth.

The above is respectfully submitted.

HENRY R. HEYL,
By his attorney, ISAAC W. HEYSINGER,
1433 *Girard Avenue, Philadelphia, Pa.*

Patent should issue to—

Henry R. Heyl, of Philadelphia, Pa., assignor to George W. Heyl, of Canton, Ohio.

32879. $\frac{642}{126}$

H. R. Heyl. Am'd't. June 14, 1881. U. S. Patent Office, June 14, 1881.

No. 32879. May 10, 1881.

Room No. 95.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *June* 15, 1881.

Henry R. Heyl, care Isaac W. Heysinger, Phila., Pa.:

Upon further consideration of this matter, with a view to final action, the 2d clause of claim is found defective, in the absence of any mechanical combination between the "knob G" and the other elements included in the combination. To obviate this objection a "reciprocating driver" should be added to the combination. This clause of claim should be written over entire and submitted in lieu of the present 2d clause. The remaining clauses of claim may be allowed.

J. P. CHAPMAN, *Ex.*

32879. $\frac{642}{126}$

H. R. Heyl. 2. June 15, 1881.

123 PHILADELPHIA, PA., *June* 17, 1881.

Hon. Comm'r of Patents, Washington, D. C.

SIR: In the matter of the application of Henry R. Heyl for patent (reissue) for devices for inserting metallic staples, filed May 10, 1881, please cancel the second clause of claim and substitute therefor the following:

"2. In a device for inserting metallic staples the combination of the staple guide B, anvil A^1, spring D, and reciprocating driver provided with the knob G, the whole arranged to operate substantially as and for the purpose set forth."

The above complies with the suggestion of the examiner dated June 15, 1881.

Respectfully submitted.

HENRY R. HEYL,
By his attorney, ISAAC W. HEYSINGER.

32879. $\frac{642}{126}$

H. R. Heyl. Am'd't. June 18, 1881. U. S Patent Office, June 18, 1881.

32879. DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *June* 23, 1881.

Henry R. Heyl, assor., care J. W. Heysinger, Phila., Pa.

SIR: Your application for reissue of patent No. 195,603, for improvement in devices for inserting metallic staples, has been examined and allowed.

124 The patent will be forwarded to you as soon as practicable in due order of business.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

Serial No. 32,879. Exr. Book No. $\frac{642}{126}$

1881. Chapman.

Reissue.

No. 9803.
Henry R. Heyl, assor. to
George W. Heyl, of same place,
Of Philadelphia,
County of "
State of Pennsylvania.
Invention, devices for inserting metallic staples.

Parts of application filed.
Petition, May 10, 1881.
Affidavit, " " "
Specification, " " "
Drawing, " " "
Model in original case.
Cert. copy Old patent } No. 195,603, Sept. 25, 1877.
Cert. dep.,
Cash, $30, May 10, 1881.
Abstract of title, " " "
App. filed complete, " " "
2. Examined June 21, 1881. Chapman, Ex.
Countersigned June 24, '81.
June 24, '81. For Commissioner.
Notice of allowance, June 23, 1881.

4. Patented Sept. 25, 1877.
Reissued July 12, 1881.
Att'y or P. O. address, Isaac W. Heysinger, Phila., Pa.

125 1881.

Contents.

Application papers.
1. Sub. spec., May 12, 1881.
2. 2 May 10, 1881.
3. Sub. spec., May 12, 1881.
4. 1 May 14, 1881.
5. Am'd't, May 31, 1881.
6. 2 June 4, 1881.
7. Am'd't, June 14, 1881.
8. 2 June 15, 1881.
9. Am'd't, June 18, 1881.
10.
11.
12.
13.
14.
15.
16.
17.
18. 24 clasps and buckles, paper fasteners.
Title: Improvement in device for inserting metallic staples.
Ex'd: E. McK., G. W.

126 UNITED STATES PATENT OFFICE.

HENRY R. HEYL, of Philadelphia, Pennsylvania, assignor to George W. Heyl, of same place.

Device for Inserting Metallic Staples.

Specification forming part of Reissued Letters Patent No. 9803, dated July 12, 1881. Original No. 195,603, dated September 25, 1877. Application for reissue filed May 10, 1881.

To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in paper fasteners, which improvement is fully set forth in the following specification and accompanying drawings, in which Figs. 1 and 5 are side elevations of the fastener embodying my invention; Fig. 2 is a vertical section in line *x x*, Fig. 1; Fig. 3 is a side elevation, partly sectional; Fig. 4 is a horizontal section in line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of an implement of the form of a hand stamp, by which metallic staples may be forced through sheets of paper or documents and secured by clinching the legs on the reverse side.

127 Referring to the drawings, A^1 represents a stationary anvil, which is secured to or formed with an arm rising from a suitable stand of convenient form for use upon a writing desk, and B represents a sliding guide block, fitted to the anvil A^1 by a sliding joint, and having grooves, C C, which match with the tongue of the anvil, the upper face of the block being flat. The normal position of the guide B is elevated, and in order to keep it in this position or from dropping prematurely I employ a spring, D, which may press up under the guide or a spring, D^1, which may press against it and thus produce the necessary friction. E represents a reciprocating driver whose under face is flat, and in the same is a concave recess, F, said driver having a knob, G, for receiving the blows of the hand, and provided with a spring, H, for causing the return or elevation of the driver.

The operation is as follows: A staple is placed within the grooves C C with its crown resting on the anvil A^1, the points thus being turned toward the bending recess F. The papers to be united are now placed beneath the driver, and by a sharp blow of the hand upon the knob G the driver is forced downward upon the papers. The staple legs come through the papers into the recess F where they are bent over by the slanting ends thereof.

It will be seen that the grooves C C serve to support and guide the staple legs during their penetration through the papers, and the recess F is so shaped that as the staple legs enter thereinto they will strike the concave or slanting walls of said recess, and thus be bent inward toward each other, as shown in Figs. 2 and 3. A plate, *a*, may be advantageously employed to overlap the staple crown for preventing the latter from bending while the legs are being forced through the papers.

It will be seen that the staple support or anvil A^1 with the slotted or recessed hammer operates to insert a staple through layers of stock to be united, and simultaneously bends over its projecting ends.

128 In my original specification I describe the further separate operation of completely flattening down the ends of the staple thus bent over by a second blow between the upper and lower jaw of the implement, believing that the same was new, but I have since learned that the same result was obtained by devices described in previous letters patent of the United States. Should the legs of the staple, when bent over by the same blow which drives the same, as is hereinabove described, be found not to lie sufficiently close to the surfaces of the paper the same may be further flattened down by a second blow between flat surfaces in front of the staple channel and bending recess, respectively, provided therefor.

Figs. 1, 2, and 3 show a hand stamp embodying my invention, in which the driver reciprocates in a fixed head in the manner of a plunger, while Fig. 5 shows the same invention embodied in a hand

stamp in which the driver is mounted at the end of a vibrating arm pivotted at its rear extremity to the base which rests upon the table. It will be seen that the devices which constitute my invention are to be found in both these modifications and that both operate in precisely the same manner to insert, by a blow upon the knob G of the hand stamp, the staple through layers of stock to be united and simultaneously bend over the projecting ends in the opposite bending recess provided therefor.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The combination of the stationary staple support or anvil A^1 and the sliding staple guide B with the reciprocating slotted or recessed hammer, operating to insert a staple through layers of stock to be united and simultaneously bend over its projecting ends, substantially as and for the purpose set forth.

129 2. In a device for inserting metallic staples the combination of the staple guide B, anvil A^1, spring D, and reciprocating driver provided with the knob G, the whole arranged to operate substantially as and for the purpose set forth.

3. A staple-inserting implement having two opposite jaws arranged with relation to each other substantially as shown, one of which is provided with a recess, the other with a vertically-channelled staple guide, an anvil, and a spring, so that when the jaws are separated after driving a staple the guide will be open for the reception of the succeeding staple, substantially as described.

4. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess and the other with staple guiding grooves and an anvil fitted thereto, in combination with a knob to receive the blow of the hand and insert a staple by a sudden percussion, substantially as described.

5. In a staple-inserting machine, constructed to operate substantially as described, the staple guiding block B, having staple holding grooves, C C, forming side extensions of the vertical slot S, substantially as shown and described.

6. An implement for inserting metallic staples, consisting of two opposite jaws, one of which is provided with a staple-bending recess and the other with staple guiding grooves and an anvil fitted therein, the said jaws being so arranged as to be separated and stand apart to admit the requisite manipulation for conveniently placing a staple in the open end of the said staple guiding grooves, substantially as set forth.

7. The combination of the stationary staple support or anvil A^1 with the sliding guide B grooved to partially embrace and guide the staple legs, substantially as and for the purpose set forth.

8. In an implement for inserting metallic staples, a recip-
130 rocating driver provided with a knob to receive the blow of the hand, in combination with a grooved staple guiding block, and an anvil attached to a stand of convenient form for use upon a writing desk, the said stand having an arm rising therefrom and

over and above it a guide for the purpose of guiding the said driver to the said anvil, substantially as and for the purpose set forth.

HENRY R. HEYL.

Witnesses:
P. O'DONNELL.
F. L. ROEPKE.

RESPONDENT'S EXHIBIT No. 1. Heyl's Original.

131 UNITED STATES PATENT OFFICE.

HENRY R. HEYL, of Philadelphia, Pennsylvania.

Improvement in Devices for Inserting Metallic Staples.

Specification forming part of Letters Patent No. 195,603, dated September 25, 1877; application filed September 20, 1877.

To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in paper-fasteners, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figures 1 and 5 are side elevations of the fastener embodying my invention. Fig. 2 is a vertical section in line *x x*, Fig. 1. Fig. 3 is a side elevation, partly sectional. Fig. 4 is a horizontal section in line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of an implement of the form of a hand-stamp by which metallic staples may be forced through sheets of paper documents, and secured by clinching the legs on the reverse side.

Referring to the drawings, A represents a stationary anvil, which is secured to or formed with an arm rising from a suitable stand of convenient form for use upon a writing-desk, and B represents a sliding guide-block fitted to the anvil A by a sliding joint, and having grooves C C, which match with the tongue of the anvil, the upper face of the block being flat. The normal position of the guide B is elevated, and in order to keep it in this position, or from dropping prematurely, I employ a spring, D, which may press up under the guide, or a spring, D′, which may press against it, and thus produce the necessary friction. E represents a reciprocating driver, whose under face is flat, and in the same is a concave recess, F, said driver having a knob, G, for receiving the blows of the hand, and provided with a spring, H, for causing the return or elevation of the driver.

The operation is as follows: A staple is placed within the grooves C C, with its crown resting on the anvil A, the points thus being

upward. The papers to be united are now placed upon the face of the guide B over the staple-points, and, by a sharp blow of the hand upon the knob G, the driver is forced downward upon the papers. The guide B gives way, and the staple-legs come up through the papers into the recess F, where they are bent over preparatory to the final clinching. The hand is now released from the knob of the driver, the latter then rising, and the papers are drawn somewhat forward, until the staple-crown rests upon the face of the guide B, when another blow is imparted to the driver, and the flat portion of its face descends forcibly on the staple-legs, so as to bend the latter close to the paper, thus completing the operation.

It will be seen that the grooves C C serve to support and guide the staple-legs during their penetration through the papers, and the recess F is so shaped that, as the staple-legs enter thereinto, they will strike the concave or slanting walls of said recess, and thus be bent inward toward each other sufficiently to insure their being bent down properly when again struck between the faces of the guide B and driver E.

A plate, *a*, may be advantageously employed to overlap the staple-crown for preventing the latter from binding while the legs are being forced through the papers.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The reciprocating driver E, constructed with a flat face recessed, substantially as described, whereby the projecting ends of staples may be first bent over by entering the recess and then flattened down by pressure from the flat face.

2. The self-adjusting guide-block B, having staple-guiding grooves C C and a flat face, upon which to complete the clinching of the staple, substantially as and for the purpose set forth.

3. The combination of the stationary staple support or anvil A with the sliding guide B, grooved to partially embrace and guide the staple-legs, substantially as and for the purpose set forth.

4. The combination of the stationary staple support or anvil A with the reciprocating slotted or recessed hammer, operating to insert a staple through layers of stock to be united and simultaneously bend over its projecting ends, substantially as and for the purpose set forth.

HENRY R. HEYL.

Witnesses:
JOHN A. WIEDERSHEIM.
H. E. HINDMARSH.

(Here follow diagrams marked pp. 132, 133, 134.)

H. R. HEYL.

DEVICES FOR INSERTING METALLIC STAPLES.

No. 195,603. Patented Sept. 25, 1877.

No. 82. Crawford v. Messinger et al. p. 132

Fig. 1.

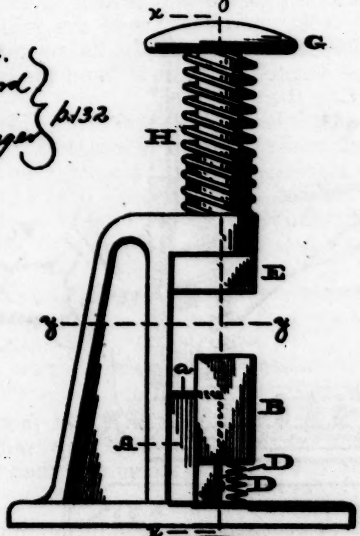


Fig. 2.

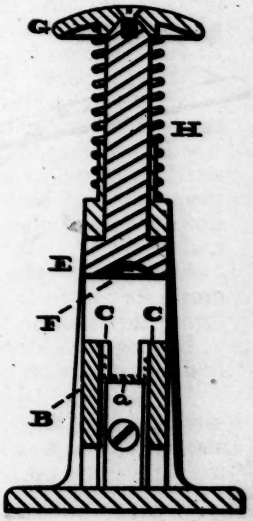


Fig. 3.

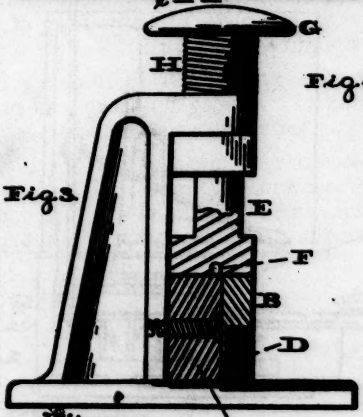


Fig. 4.

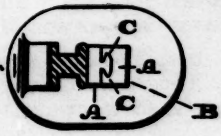
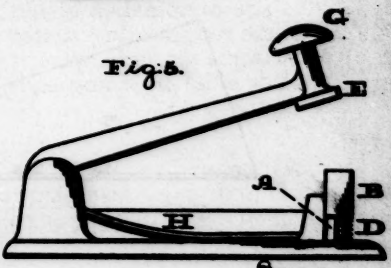


Fig. 5.



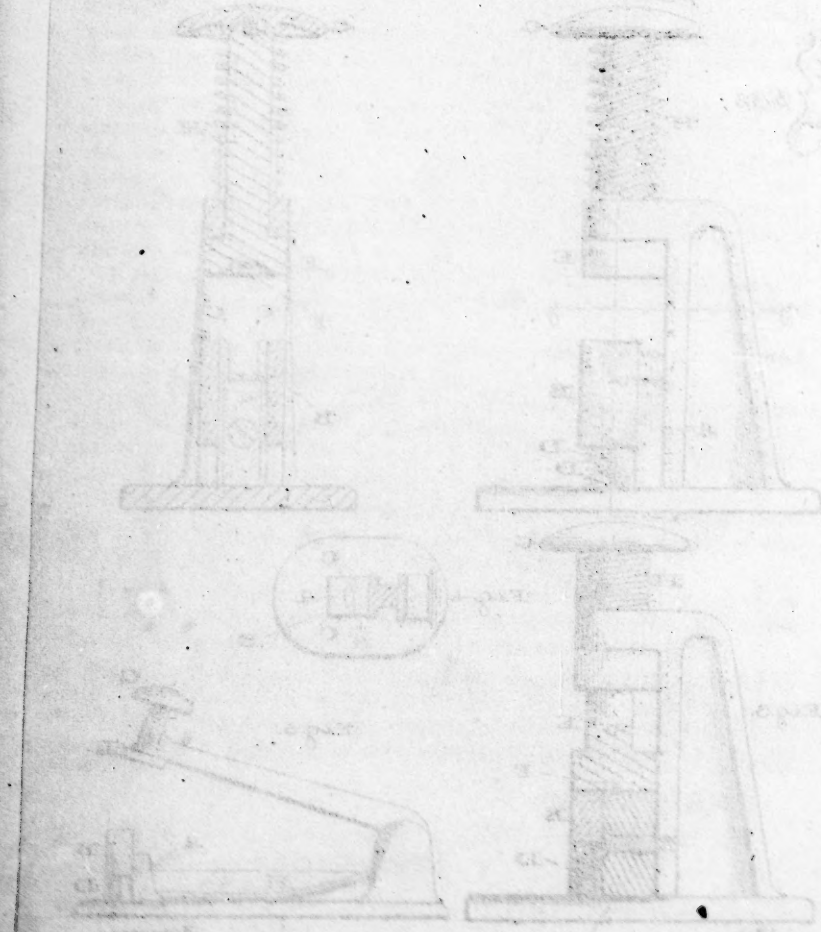
Witnesses:
Lewis J. Bond
A. P. Grant

Fig. 6.

Fig. 7.

Fig. 8.

Inventor:
H. R. Heyl
by
John A. Wakefield
Attorney.



D. M. Smyth,
Wiring Blinds.

No 41,180. Patented Jan 5, 1864.

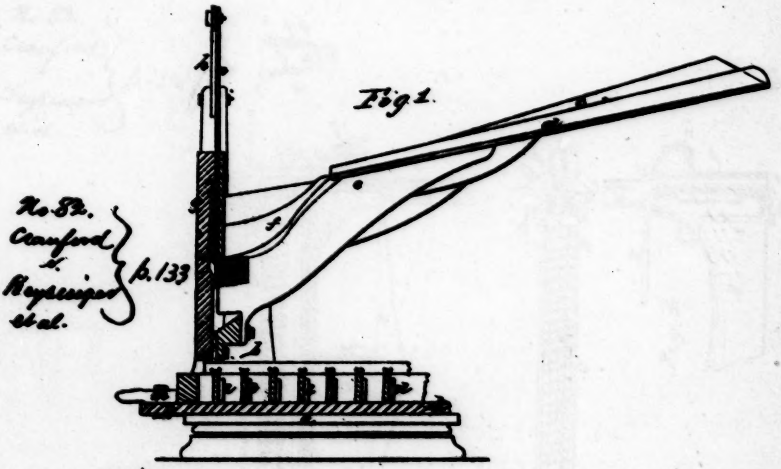


Fig 1.

No 82. Crawford & Hopkins et al. p. 133

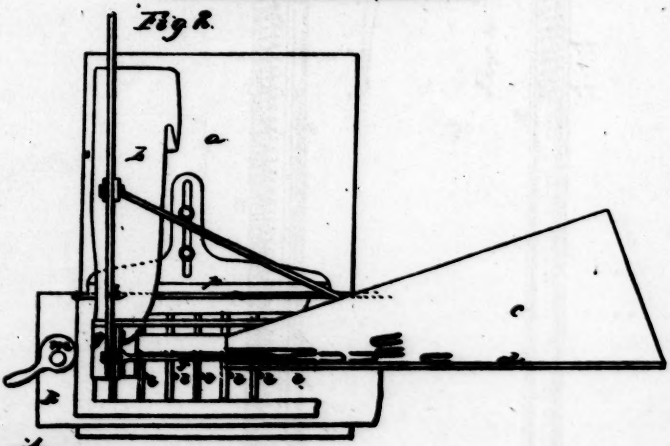
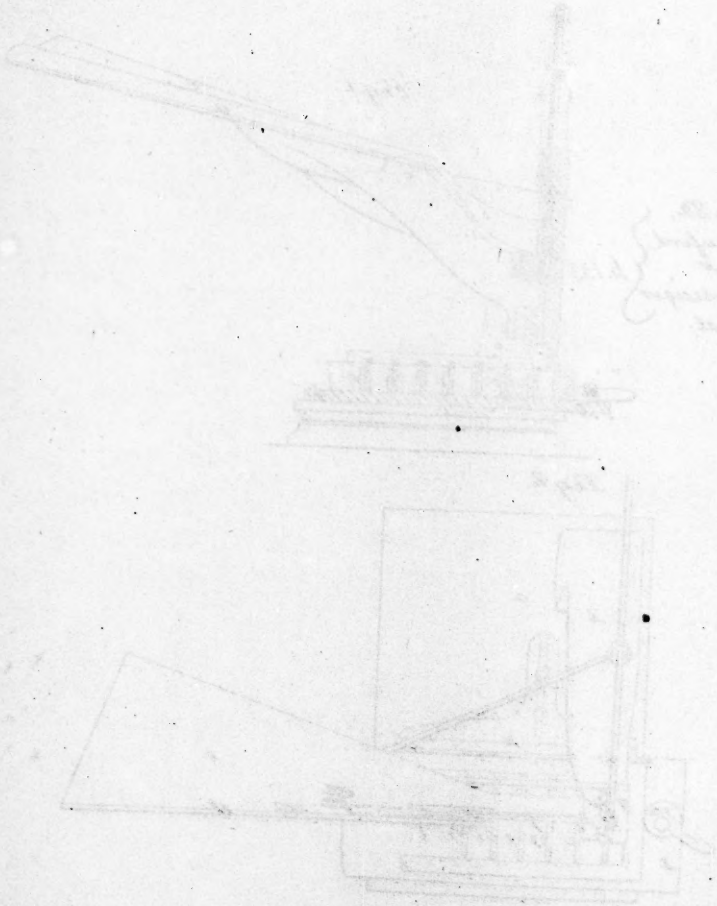


Fig 2.

Witnesses.
Samuel A. Knight
Edwd. A. Smith

Inventor
Danl. M. Smyth



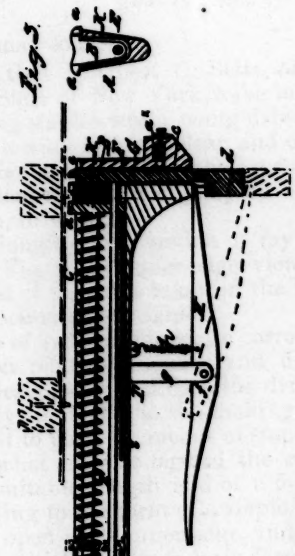
H.C. Betts,

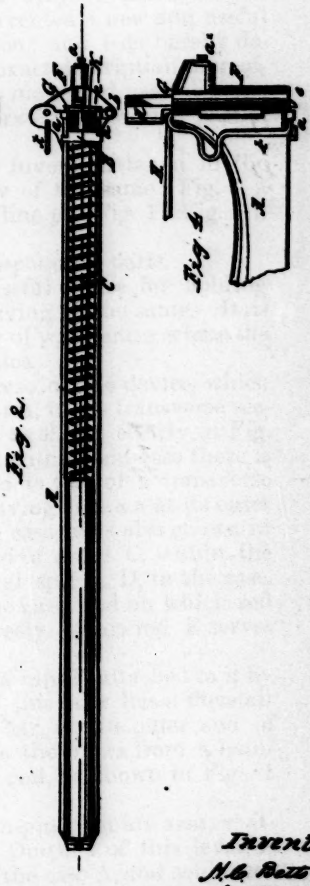
134

Wiring Blinds, Fences &c.

No 56,884 Patented Aug. 7, 1866.

No. 82. Crawford v. Heysinger et al. p. 134





Witnesses:
W. B. Lossing
Chas Dusoli

Inventor:
H. C. Betts
per Munn & Co
Attorneys

135 UNITED STATES PATENT OFFICE.

ALBERT C. BETTS, of Troy, New York.

Improvement in Tools for Holding and Driving Staples for Wire Fences.

Specification forming part of Letters Patent No. 56884, dated August 7, 1866.

To all whom it may concern:

Be it known that I, Albert C. Betts, of Troy, in the county of Rensselaer and State of New York, have invented a new and useful device for holding staples while being driven; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section of my invention taken in the line *x x*, Fig. 2; Fig. 2, an inner-edge view of the same; Fig. 3, a transverse section of the same taken in the line *y y*, Fig. 1; Fig. 4, a side view of a portion of the same.

Similar letters of reference indicate corresponding parts.

This invention relates to a new and useful device for holding staples, and is designed to facilitate the driving of the same. It is more particularly applicable to the making of wire fences where the wires are secured to posts by means of staples.

A represents what may be termed the case of the device, which may be of any suitable length and of a form, in its transverse section, corresponding to the form of a staple, as shown clearly in Fig. 3. This case is open at its inner edge, and within said case there is fitted a slide, B, which corresponds in form to that of a transverse section of the case, as shown in Fig. 3, having lips *a a* at its outer end, which lap over the inner edge of the case, as is also shown in Fig. 3. This slide B is attached to one end of a rod, C, within the case A, said rod being fitted within a spiral spring, D, in the case. E is a rod secured longitudinally within the case, and on which rod the slide B is fitted and allowed to move freely. This rod E serves as a guide for the slide.

The case A at one end is provided with a cap, F, attached to it by a hinge or joint, *b*. The inner surface of this door has a dovetail groove, *c*, made in it, to receive a sliding bar, G, the outer end of which is formed with a head, *d*, to receive the blows from a hammer. This bar G has a lip, *e*, at its inner end, as shown in Figs. 1 and 4.

H is a lever, which works on a fulcrum-pin, *f*, in an arm, *g*, attached to or projecting from the case A. One end of this lever is fitted between the head *d* of the bar G and the case A, and said lever has a spring, *h*, connected with it, which spring has a tendency to keep the end of the lever between the head *d* and the case A in contact with the latter.

The slide B also has a rod, I, attached to it, with a hole, *i*, made in it, near its outer end, to receive, when the slide B is drawn back, the hook *j* of a thumb-catch, J, fitted in the case A, as shown in Fig. 1.

The device is used as follows: The slide B is drawn back within the case A until the catch J engages with the rod I and holds the slide B, as shown in red in Fig. 1. The cap F is then shoved open, and the staples K fitted in the case, the latter, between slide B and the cap F, being filled. The cap F is then closed and secured by a suitable fastening, *k*, the slide B liberated by actuating the catch J. The spring D has a tendency to press the staples K apart. The cap F and the bar G being forced outward from the case by actuating the lever H, the outermost staple will be in line with bar G and against the lip *e* thereof, as shown in red in Fig. 1. The device being then adjusted to the post so that the outermost staple, in line with the bar G, will be over the spot where it is to be driven, the operator strikes the head *d* of the bar G with a hammer and drives the outermost staple into the post. The bar G is then moved outward by pressing upon lever H with the thumb, and the spring D forces another staple, K, in contact with the cap F and in line with bar G, and the device is adjusted to the post where a succeeding staple is to be driven, and so on.

It will be seen that by this simple device the staples may be driven and a wire fence constructed in a rapid manner.

A spring-stop, a^x, is inserted in the cap F to limit the outward movement of the sliding bar G. (See more particularly Fig. 1.)

Having thus described my invention, I claim as new and desire to secure by letters patent—

1. A device for holding staples for the convenience of driving the same, composed of a case in which the staples are placed, a slide and spring, and a sliding bar, which is actuated by a hammer for driving the staples, all being arranged substantially as shown,
136 so that when one staple is driven by striking the bar, and the latter is moved back, a succeeding staple will be adjusted or thrown in line with the bar for the purpose of being driven, as set forth.

2. The placing of the sliding bar G in a hinged cap, F, arranged with the case A, so that when said cap F is opened the bar G will be out of the way and the end of the case left open for the ready insertion of the staples.

The above specification of my invention signed by me this 27th day of September, 1865.

A. C. BETTS.

Witnesses:

M. M. LIVINGSTON.
C. L. E. TOPLIFF.

(Here follows diagram marked p. 137.)

J. TOMLINSON.

Improvement in Devices for Driving Staples.

No. 132,221. Patented Oct. 15, 1872.

No. 82. Crawford v. Messenger et al. p. 137

Fig. 1.

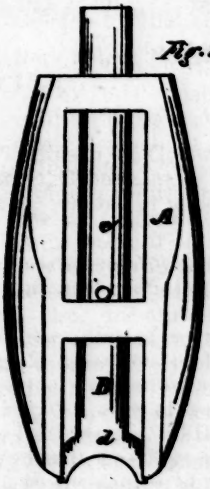
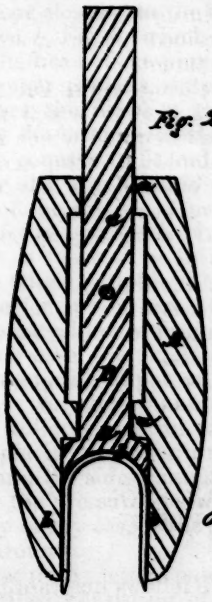


Fig. 3.

Fig. 4.

Fig. 2.



Witnesses.
W. A. Cooder
Archie Baird

Inventor.
James Tomlinson,
per R. F. Osgood,
Attorney,

the grooves *b f*, for receiving the staple all the way around its periphery.

JAMES TOMLINSON.

Witnesses:
JAS. LORENZO GAGE.
GEO. A. GAGE.

(Here follows diagram marked p. 139.)

140 UNITED STATES PATENT OFFICE.

GEORGE W. MCGILL, of Washington, District of Columbia.

Letters Patent No. 67665, dated August 13, 1867.

Press for Attaching Paper-Fasteners.

The schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, George W. McGill, of Washington city, in the county of Washington and District of Columbia, have invented a new and useful press for attaching my paper-fastener (patented July, 1866, antedated January 24, 1866) to papers, &c., and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in constructing a press provided with a spring-plunger, to act as a hammer and punch for punching holes in papers to admit the fastener, and for separating and hammering down the shanks of the fastener even with the paper it is designed to connect.

Figure 1 is a side view of the press.

a is the plunger, *b b* sockets through which it works, *c* a guide to hold it in position, *d d* a spiral spring, *e* the hammer, *f f* the body of the press, *g* the punch, *h* a socket in the hammer to receive the punch, *k* a plug pressing down the spring *d d*; the socket *h* is square or rectangular.

Figure 2 is a sectional view of the hammer *e* and base of the socket *h*.

Figure 3 is a sectional view of the plunger *a* and hammer *e*; *m* is a portion of the hammer which runs up into the plunger, and *n* is a pivot to hold it there.

Figure 4 is a sectional view of the sockets *b b*, with the plunger *a* in the centre and the guide *c* in its socket.

Figure 5 is a sectional view of the hammer *e*, and represents the form of the socket *h*, which increases in width from its base.

Figure 6 represents a flat view of the bottom of the press.

To work the press a hole is first made in the paper which it is designed to connect by placing it over the punch *h* and driving down the plunger *a*. The paper is then removed and a fastener inserted

G. W. McGill.

Press for Paper Fasteners

No. 67665. Patented Aug. 13. 1867.

Fig. 1.

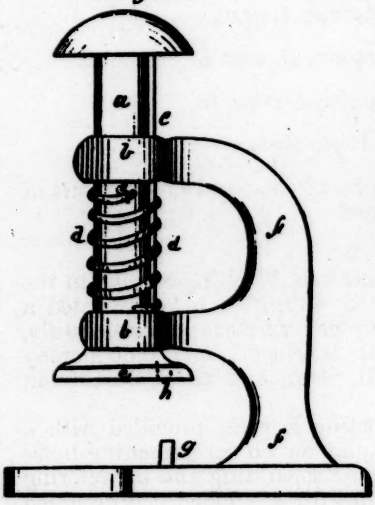


Fig. 2.

Fig. 3.

No. 82, Crawford v. Mayenigen et al. p. 139

Fig. 4.

Fig. 5.

Fig. 6.

Inventor.

G. W. McGill

Esser & Steere.

Attaching Buttons.

No. 78,077. Patented May 19, 1868.

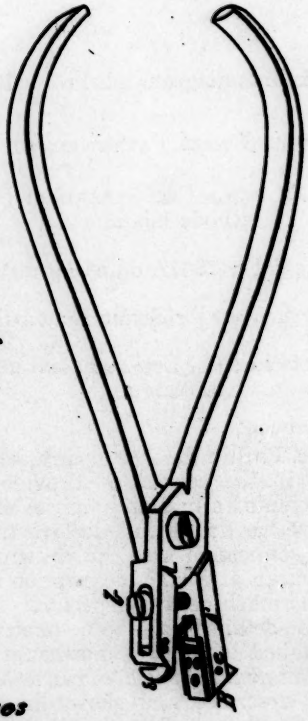


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

No. 82. Crawford v. Keysinger et al. p. 141

Witnesses

John D. Thurston

William W. Rickard.

Inventors.

Thilley Esser

Franklin A. Steere

in the hole thus made. The fastener is then placed under the front part of the hammer and the plunger is again driven down, which causes the shanks of the fastener to spread apart and brings them in close contact with the paper and thus binds it.

I hold this press to be a modification of the one, a drawing of which was submitted with that of my paper-fastener above referred to, and is for the same purpose.

What I claim as my invention, and desire to secure by letters patent, is—

A press with plunger, hammer, and punch, constructed, combined, and arranged substantially as described.

GEORGE W. McGILL.

Witnesses:
JOS. L. COOMBS.
EDM. F. BROWN.

(Here follows diagram marked p. 141.)

142 UNITED STATES PATENT OFFICE.

PHILLIP ESSER and FRANKLIN A. STEERE, of North Providence, Rhode Island.

Letters Patent No. 78077, dated May 19, 1868.

Improved Machine for Setting Button-Hooks.

The schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, Phillip Esser and Franklin A. Steere, both of North Providence, in the county of Providence and State of Rhode Island, have invented a new and improved machine for setting button-hooks, and we do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 exhibits the machine in perspective.

Figure 2, 3, and 4 are detailed parts to be referred to.

Our machine is designed to afford a means for conveniently inserting in shoes and gaiters that article known as a "combined hook and botton," which is described and shown in the letters patent granted William H. Shurtleff, of Providence, Rhode Island, dated June 5, 1866, and which, for holding lacings for shoes and like purposes, is intended to supersede the use of eyelets.

The drawing represents a hand tool, but the same principles which are employed in it can be equally well embodied in a machine to be operated by power.

The article referred to as a combined hook and button consists of a metallic button head set upon a crooked neck and furnished with

three prongs, which prongs are intended to be inserted in the material to which the article is to be affixed and clinched upon the back side thereof, leaving upon the face side of the material in sight only the crooked neck surmounted by a button-head.

In the particular instance shown in the drawings A A′ are jaws held together by a pivot-pin, *a*, and being intended for a hand machine, are furnished with handles like a pair of well-known pliers. The upper jaw may be furnished with an adjustable stop, *b*, or other convenient device for limiting the distance withing which the jaws can be opened. The lower jaw is furnished with a sided block, B, having three rectangular faces of equal size and two sides in the form of equilateral triangles. The end of the lower jaw A′ is made forked, and the block is mounted in the opening formed by the forks, so that it can be revolved upon a pin, *c*, passing through the sides of the fork and the triangular faces of the block.

A spring-pawl, *d*, Fig. 4, is attached to the upper jaw, and is so arranged with reference to the block B that upon opening the jaws A A′ to their full extent the block will be made to turn one-third of a complete revolution upon its axis, while during the movement of the jaws in closing the flat face of the spring shank of the pawl will bear against one of the sides of the block and hold it in that position until the next movement of the jaws in opening.

The several faces of the block are as shown in Figs. 2, 3, and 4. The first is provided with three holes corresponding in position and in depth with the arrangement and length of the three prongs of the button-hook, as shown in Fig. 1. The second face is furnished with a depression in the form of a segment of a hollow sphere. The third face presents a smooth surface.

The operation of the apparatus is as follows: The button-hook is hung by its neck in the receptacle E, especially made for the purpose, upon the upper jaw, that face of the block B being uppermost which is furnished with holes corresponding in number and arrangement to the prongs of the button-hook.

The piece of leather or other material to which the button-hooks are to be attached is now held in position and the jaws are made to close. This causes the sharp prongs of the button-hook to pierce the material, and being forced through it protrudes beyond the under side, the button-hook being all the time retained in the receptacle E.

The next movement of opening the jaws causes the protruding ends of the prongs to be withdrawn from the holes in the block, and the block itself to be rotated, so as to cause the face shown in Fig. 2 to be uppermost. The next movement of the jaws in closing bends the ends of the prongs inward toward a common centre. The jaws being again opened, the block is again rotated, so that its
143 smooth face is uppermost, when, the jaws being again made to approach each other, the ends of the prongs are pressed down flat against the under surface of the material, and the button-hook is securely set.

Upon opening the jaws for the last time prior to disengaging from the apparatus the button-hook which has just been set the

HORACE C. BRADFORD.

Improvement in Tools for Setting Hook Buttons.

No. 120,703. Patented Nov. 7, 1871.

No. 82. Crawford v. Heysinger et al. p. 144

Fig. 1.

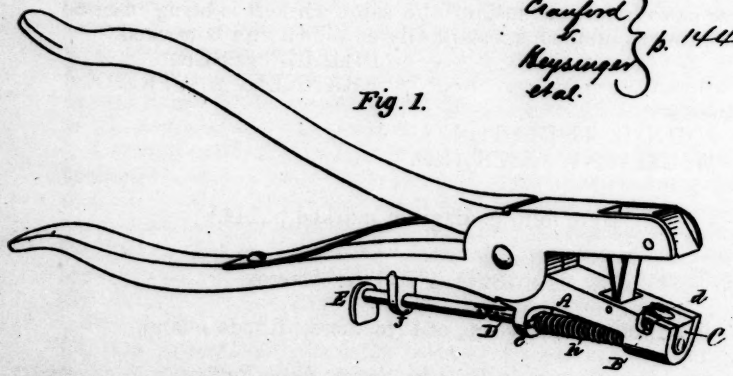


Fig. 2.

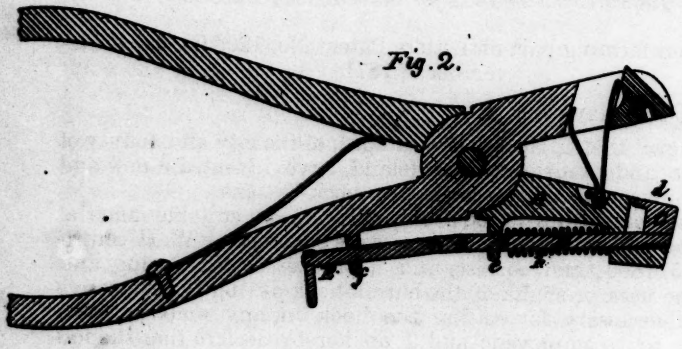


Fig. 3.

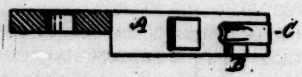


Fig. 4.

Witnesses
Phil. R. Farnell
F. A. Jackens

Inventor.
Horace C. Bradford.
By Munn & Co
Attorneys.

block is again rotated, so as to present uppermost the face shown in Fig. 1, and ready for a repetition of the first operation to be performed in setting the next button-hook in the jaws.

What we claim as our invention, and desire to secure by letters patent, is—

1. A machine for setting button-holes, consisting of a revolving block, B, with acting faces, as described, in combination with the spring-pawl *d* and jaws A A, operating substantially as set forth.

2. Constructing the jaw A with a receptacle, E, for the button-hook, so as to hold and sustain the same while it is being inserted and its prongs clinched, substantially as shown and is worked.

PHILLIP ESSER.
FRANKLIN A. STEERE.

Witnesses:
JOHN D. THURSTON.
WILLIAM W. RICKARD.

(Here follows diagram marked p. 144.)

145 UNITED STATES PATENT OFFICE.

HORACE C. BRADFORD, of Providence, Rhode Island.

Improvement in Tools for Setting Hook-Buttons.

Specification forming part of Letters Patent No. 120,703, dated November 7, 1871.

To all whom it may concern:

Be it known that I, Horace C. Bradford, of the city and county of Providence and State of Rhode Island, have invented a new and useful improvement in tools for setting hook-buttons.

My invention relates to tools for setting in any suitable material such combined hooks and buttons as were patented by W. H. Shurtleff, June 5, 1866; and consists in a novel device for seizing and holding the neck or shank of the button-hook during the successive operations necessary for setting the hook in any material with which it is to be employed; and I do hereby declare that the following specification, taken in connection with the drawing furnished and forming a part of the same, is a clear, true, and exact description of my invention as applied to a hand-tool, and in combination with one kind of setting mechanism.

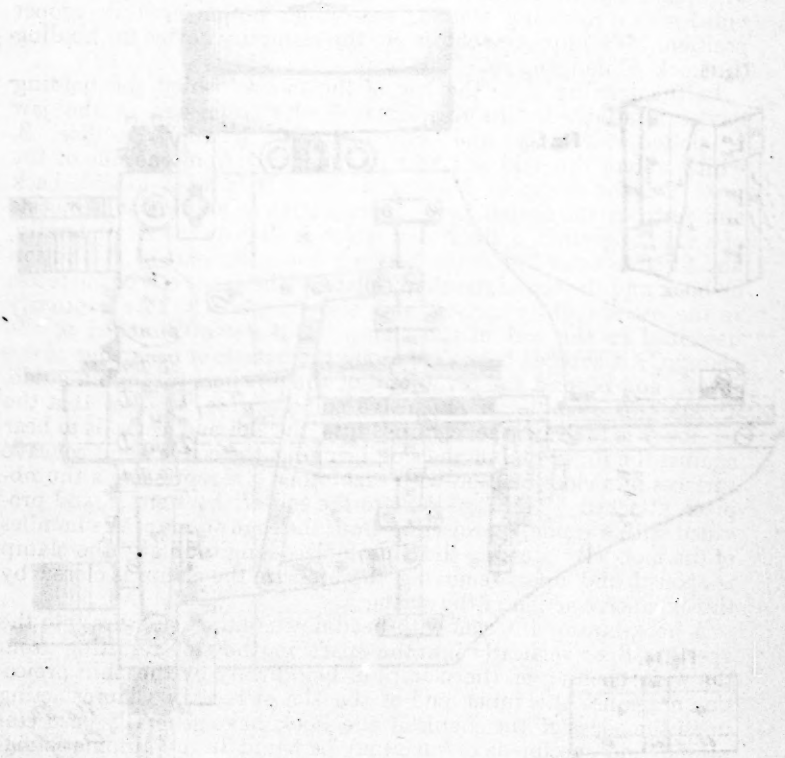
Referring to the drawing, figure 1 represents a hand-tool in perspective, with my novel holding device. Fig. 2 represents a portion of the tool in longitudinal vertical section. Fig. 3 represents in top view the inside of the jaw of the tool which contains my novel holding device. Fig. 4 represents a hook-button.

This "hook-button," sometimes called "button-hook," may be briefly described as a combined hook or button, provided with three prongs which stand at right angles to the plane of the opening in

the hook. In describing my invention I designate that portion of the hook-button which connects the button face with the plate from which the prongs project, as the shank or neck of the hook. The tool with which, for the purposes of illustration, I have combined my invention, was patented by Esser and Steere May 19, 1868; and it is only necessary to briefly state that it consists of a pair of pinchers, one jaw of which is provided with a revolving triangular block, the faces of which are in regular order drilled to receive the prongs, provided with a concave recess for bending the prongs inward, and a plane surface for clinching. The opposite jaw is provided with a retaining slot for receiving a button-hook in proper position. My improvement is in the clamping device for holding the hook while being set.

In the drawing, A is the jaw of the tool to which the holding device is attached. In this instance, the outer end of the jaw is slotted vertically and provided with a lateral orifice, B, which enters the said slot near its inner end from one side of the jaw. C is the clamp or holding device. It is fitted to slide back and forth in the slotted jaw. Its operative or holding end consists of a thin projection, *d*, the end of which is slightly concave laterally, and fitted to enter the space between the under side of the button or hook and the top of the shank-plate. The inner end of the recess in the jaw is slightly convex, and corresponds with the concavity described in the end of the clamp. D is a stem attached to the clamp C; it extends backward along the outside of back edge of the jaw A, and beyond the pivot-joint of the pinchers through a guide, *e*. On this stem is an expansive spiral spring, *h*, so set that the tendency is to draw the clamp C into the slot and cause it to bear against the inner end of the slot, bringing the convex and concave surfaces into close relation with each other. E represents a thumb-piece, attached by a hinge-joint to the end of the stem D, and provided with a guide, *f*, projecting from the edge of one of the handles of the tool. By pressing the thumb-piece longitudinally the clamp is opened, and upon removing the pressure the clamp is closed by the expansive action of the spring *h*.

A hook-button inserted with head down (either sidewise into the aperture B, or vertically into the space in the slot resulting from the wide opening of the clamp) is held firmly by the thin projection *d* against the inner end of the slot or recess. Clamps acting upon the edges of the shank of the hook have generally been employed, and specimens of such may be found in my automatic machine for setting button-hooks, patented June 14, 1870. Clamps have also been heretofore used which would engage with the front and rear of the shank. In all such cases, however, prior to my invention, the seat which enters the button or lacing space between the under side of the button or hook and the top of the shank-plate has been fixed or stationary, and the sliding-clamp has engaged with the rear side of the shank, forcing the button into its seat, and holding it against the edge of the seat. With such clamps it frequently will occur that the hook will swing more or less to the right or left. In my improved clamp the projection *d* fills the ver-



147

4 Sheets--Sheet 1.

H. R. HEYL & A. BREHMER.

Machines for Making Boxes of Paper.

No. 132,078. Patented Oct. 8, 1872.

Fig. 15.

Fig. 1.

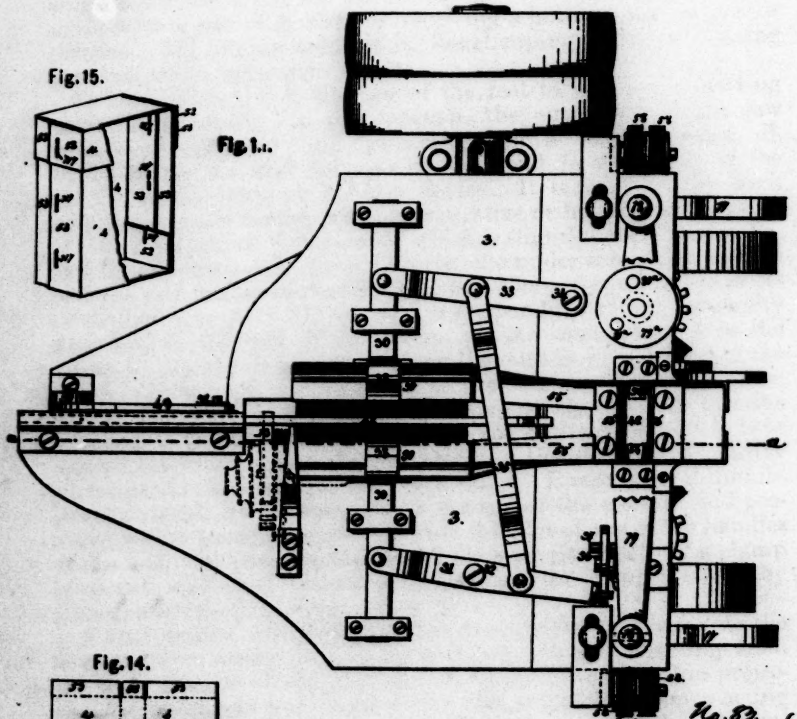


Fig. 14.

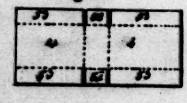
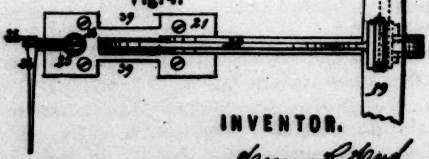


Fig. 4.



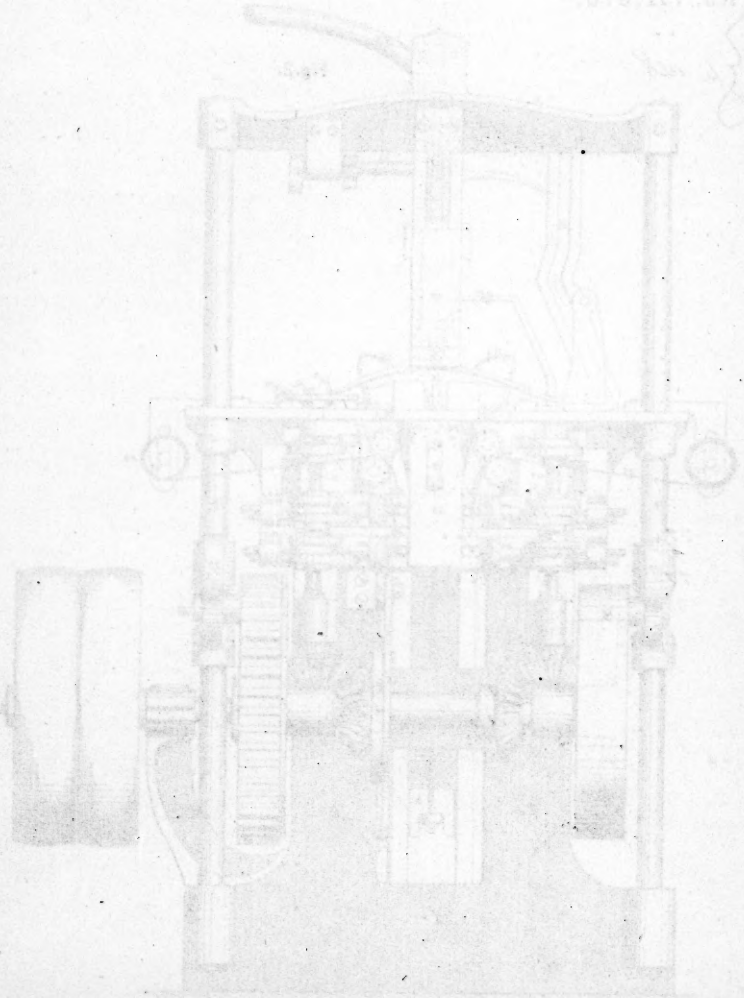
No. 82. Crawford & Keysenger et al. p. 147

WITNESSES.

John Charlton
E. Otis Haeyfield

INVENTOR.

Henry R. Heyl
August Brehmer.



148

4 Sheets--Sheet 2.

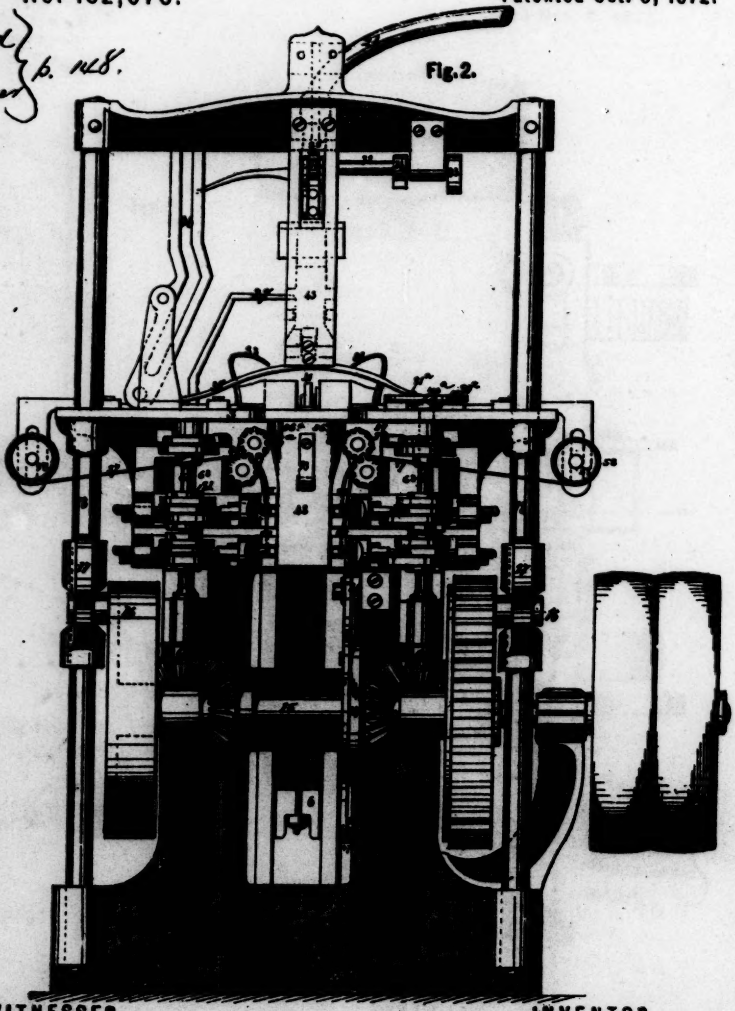
H. R. HEYL & A. BREHMER.

Machines for Making Boxes of Paper.

No. 132,078. Patented Oct. 8, 1872.

No. 82. Crawford & Heysinger et al. v. p. 148.

Fig. 2.

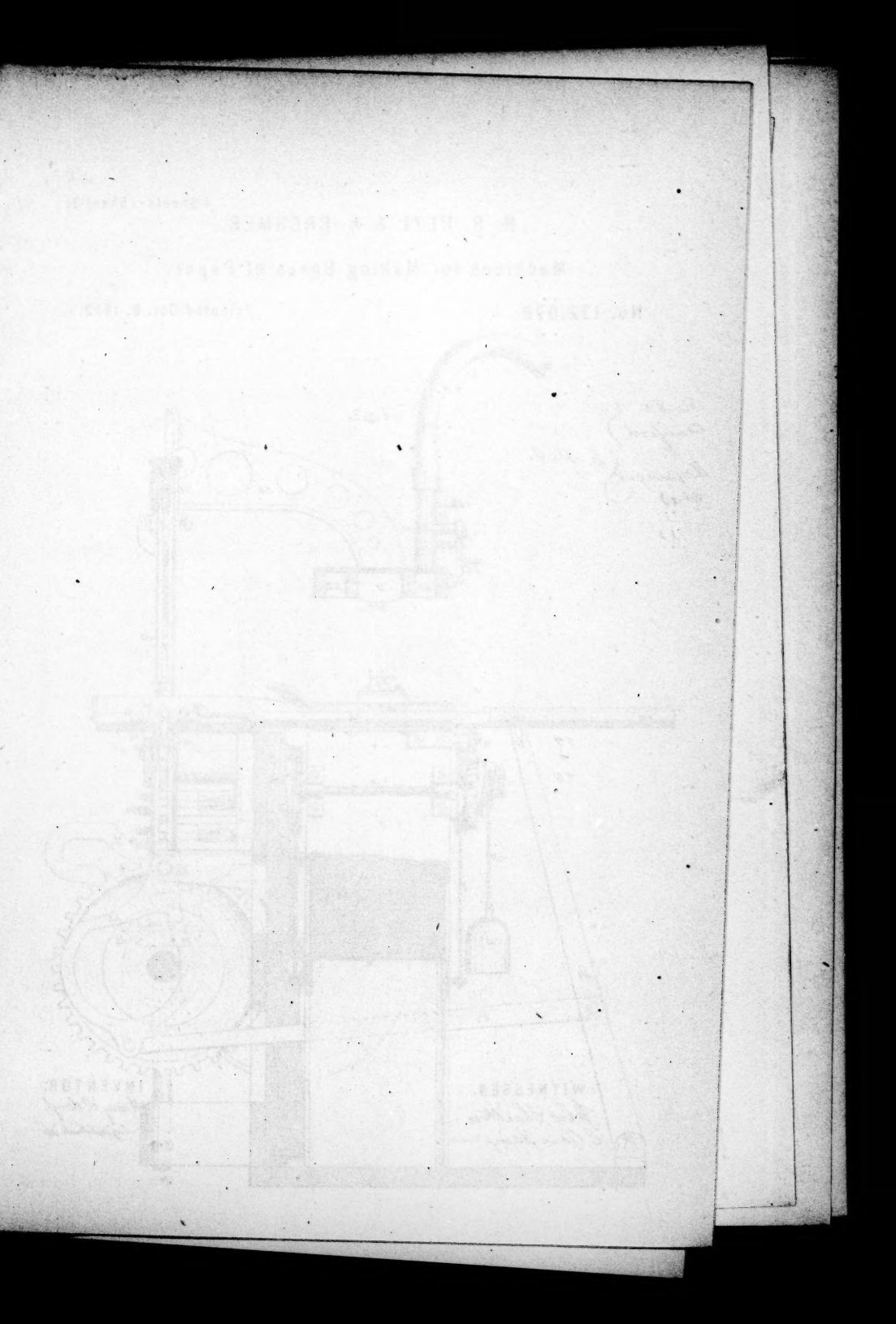


WITNESSES.

John Charlton
E. Oscar Wallgren

INVENTOR.

Henry R. Heyl
Augustus Brehmer



4 Sheets--Sheet 4.

H. R. HEYL & A. BREHMER.

Machines for Making Boxes of Paper.

No. 132,078. Patented Oct. 8, 1872.

No. 82, Crawford v. Meyeringer et al. 6, 150.

Fig. 5.

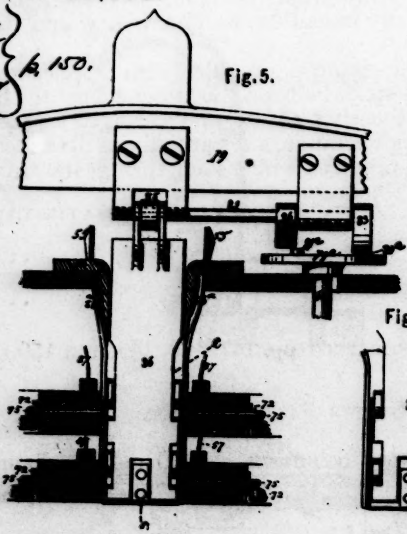


Fig. 6.

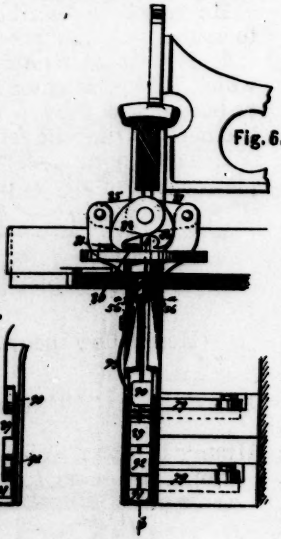


Fig. 7.

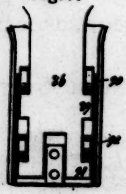


Fig. 8.

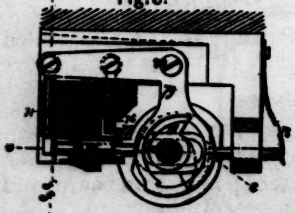


Fig. 9.

Fig. 10.

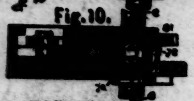


Fig. 11.

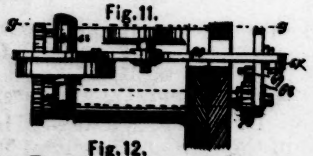


Fig. 12.

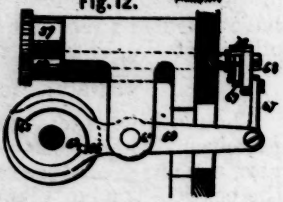
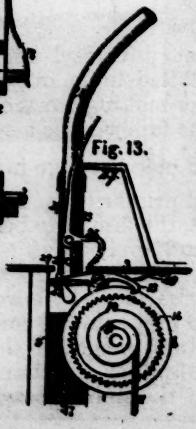


Fig. 13.



WITNESSES.

John Charlton
C. Oscar Wempner

INVENTOR.

Henry R. Heyl
August Brehmer

tical lacing-space, and sustains the hook from the time it is dropped by the feeder until its forced against the end of the slot, and
146 also until the setting operation is fully completed; in the former case, after a hook-button has been set the hook must be drawn from its stationary seat, while with my clamp the hook remains stationary, and the seat is withdrawn from it. With my improved clamp it is practically impossible to present a hook to the setting mechanism in any but a proper position.

Having thus described my invention, I claim as new and desire to secure by letters patent—

1. The movable retaining-clamp C, provided with a projection, *d*, which is fitted to enter the space between the under side of the hook or button and the top of the shank-plate, and arranged to sustain the hook during the setting operation, substantially as described.

2. The retaining-clamp, provided with a stem, spring, and thumb-piece, substantially as described.

HORACE C. BRADFORD.

Witnesses:
HENRY MARTIN,
JOHN C. PURKIS.

(Here follow diagrams marked pp. 147, 148, 149, and 150.)

151 UNITED STATES PATENT OFFICE.

HENRY R. HEYL and AUGUST BREHMER, of Philadelphia, Pennsylvania, assignors to American Paper-Box-Machine Company, of same place.

Improvement in Machines for Making Boxes of Paper.

Specification forming part of Letters Patent No. 132,078, dated October 8, 1872.

To all whom it may concern:

Be it known that we, Henry R. Heyl and August Brehmer, both of the city and county of Philadelphia, in the State of Pennsylvania, have invented a machine for making boxes of paper, pasteboard, and other material, of which the following is a specification:

Nature and objects of the invention.

The machine is intended primarily for making boxes of paper or pasteboard without cement, the fastening being effected by wire-staples, which are produced and applied by the machine which forms the boxes. The box-blanks are placed in a receptacle provided with a sliding bottom, which is drawn up by a weight and cord applied to a fusee-pulley adapted to graduate the power of the weight to correspond with the number and weight of the blanks remaining in the receptacle. The weight-pulley is detained by a ratchet, which prevents the drawing up of the sliding bottom, excepting when the

said ratchet is retracted. The blanks are taken one by one from the top of the pile by a pneumatic or suction feeder provided with automatic valves to adapt it to seize and drop the blanks at the proper moments. The said feeder in its descent retracts the detent-ratchet and receives a slight upward pressure from the pile of blanks. As the feeder rises again with one blank the detent, being released, catches the weight-pulley, so that, whether the quantity of blanks be greater or less, the top of the pile always rests at one level to receive the feeder. The blank, being deposited on a table by the feeder, is carried forward by a follower to a position over the mold, into which it is forced by a plunger, the bottom flaps being first bent up and the end flaps next folded over them as the plunger descends. The wire to form staples is in continuous lengths, contained on suitable reels, equal in number to the staples used in each box. The lengths of wire are cut off, bent into square form over suitable mandrels, which latter then recede, and the staples are, by sudden percussion, driven through the lapped sides of the box. Cavities in the plunger receive the inwardly-projecting ends of the staples, which ends are then bent in opposite directions, either toward or away from each other by slides working in the sides of the plunger. The plunger is then withdrawn, and its descent with a new box discharges that which was previously formed. The various parts are made changeable or adjustable to adapt them for the manufacture of boxes of various sizes or forms.

In the accompanying drawings, figure 1 is a plan or top view of a machine illustrating the invention with some of the upper works omitted; Fig. 2 is a front elevation; Fig. 3 is a vertical section at *a a*, Fig. 1; Fig. 4 is a plan of the upper part omitted in Fig. 1; Fig. 5 represents a vertical section of the box-mold at *b b*, Fig. 6, and an elevation of the plunger that works therein, as hereinafter described; Fig. 6 is a vertical section of the same parts in the same position in the plane indicated by the line *c c*, Fig. 5; Fig. 7 is a section at *b b*, Fig. 6, showing the parts in a different position; Fig. 8 is a horizontal section at *d d*, Figs. 9 and 10, of the devices employed to cut the wire and form and drive staples to fasten the parts of the box together; Fig. 9 is a vertical section of the same, *e e*, Figs. 8 and 10; Fig. 10 is a vertical section thereof at *f f*, Figs. 8 and 9; Fig. 11 is a sectional elevation of the mechanism employed for feeding the wire; Fig. 12 is a horizontal section of the same at *g g*, Fig. 11; Fig. 13 is a sectional elevation of the blank-feeding apparatus, hereinafter described; and Fig. 14 is a plan of a box-blank.

The main frame of the machine consists of a bed, 1, standards 2, and table 3, of proper construction to support and afford bearings for the various working parts. The box-blanks 4 4 consist of simple rectangular pieces of paper or other material, which may be cut without waste, and are prepared by slitting, as shown in Fig. 14, to separate the end flaps from the bottom flaps. The box-blanks before being placed in the machine may be slightly bent into convex form to facilitate the separation of the uppermost one, as hereinafter described. Any desired number of these blanks are placed in a vertical pile within a receptacle, 5, resting on a sliding bottom, 6, which

bottom is drawn up, as fast as the blanks are removed, by
152 cords 7 7 passing over pulleys 8 8, attached to a shaft, 9, upon which is also keyed a fusee-pulley, 10, carrying a cord, 11, from which is suspended a weight, 12. These parts are so constructed and arranged that the weight 12 will more than counterbalance the box-blanks resting on the sliding bottom 6, and as the reduction of the pile of blanks permits the weight 12 to descend, the cord 11, reaching a smaller part of the fusee 10, will act with less leverage on the elevating-cords 7, and hence the upward pressure of the bottom 6 may be graduated approximately in proportion to the weight of the box-blanks resting thereon. 13 is a detent-pawl engaging with a ratchet-wheel, 14, to prevent the elevation of the bottom 6 excepting at proper periods, when the detent is retracted.

The arrangement of the parts is such as to cause the top of the pile blanks, whether the pile be large or small, to be kept at about the same distance below the level of the table 3, as will be presently explained. 15 is the main driving-shaft, with cranks 16 16, which work in yokes 17 17 on rods 18 18 attached at top to a cross-head, 19, carrying a horizontal arm, 20, to which is attached the feeder 21. This feeder is formed with cavities 22 in its under side communicating with a nozzle, 23, to which is attached a loose or flexible tube, 24, connecting with an air-pump or any suitable exhaust apparatus. Within the nozzle 23 is a throttle-valve, 25, controlled by a bell-crank tappet, 26, one end of which, as the feeder 21 descends and presses on the topmost blank 4, strikes a stud, 27, to open the valve. The air is thus exhausted beneath the feeder. At the same time a stud, 28, on the feeder 21, strikes the heel of the detent-pawl 13, retracting it from the ratchet-wheel 14, and causing the weight 12 to press the blanks up against the feeder as the latter ascends, and to elevate the pile of blanks until the stud 28 releases the pawl 13, when the latter instantly catches the ratchet-wheel 14 to prevent the blanks rising further. The topmost blank being held by atmospheric pressure against the face of the feeder will be drawn up from the pile. The feeder may have one or more of the cavities 22 communicating with the suction tube 23, and one or more of the projections or bars 21^a, Fig. 3, placed between the cavities 22, or on one or both sides of a single cavity. The illustration shows suction cavities at the ends of the feeder and a projecting ridge between them. We have used with good effect a central cavity and ridges at the ends. The mouths or margins of the suction cavities 22 have flat faces, giving them an effective hold on the blank, and the projection or projections 21^a, by depressing another part of the blank, prevent more than one blank following it. 29 29 are pins upon the feeder to limit the movement of the valve-tappet 26 in either direction. (See Figs. 3 and 13.) Upon the table 3, directly over the blank-receptacle, is a pair of sliding plates, 30 30, which recede from each other as the plunger descends and remain apart until the plunger has ascended with a blank, when the plates again close over the blank-receptacle and receive the blank which drops from the feeder 21, as soon as the valve 25 is closed by the lower end of the tappet

26 striking the arm 27. The movement of these sliding plates is produced by levers 31 and 33, the former being fulcrumed at its center 32, and the latter at one end, 34, and the two being connected by a rod, 35. The forward end of the lever 31 is joined to a vertical lever, 36, which is fulcrumed to a stationary standard on the frame, and is operated by a stud, 37, on the cross-head 19, working in a slot in said lever 36. Lips 38, Figs. 1, 2, and 3, attached to the sliding plates 30, and projecting over the same within recesses 39, Fig. 4, in the sides of the feeder 21, insure the deposit of the blanks from the bottom of the plunger onto the plates 30. A spring, 40, is applied to the detent-pawl 13 to cause it to act promptly in arresting the motion of the shaft 9. The box-blank being deposited on the sliding plates 30, a sliding rod, 41, is moved forward, carrying the blank centrally over the mold 42 and beneath a plunger, 43, projecting downward from the center of the cross-head 19. The sliding rod 41 is then instantly drawn back. The motions of this sliding rod are effected by a cam, 44, on the main driving-shaft 15, working in a yoke-lever, 45, fulcrumed at 46 to the stationary frame and jointed at 47 to the forward end of a connecting-rod, 48, the rear end of which is jointed to a vertical lever, 49, which latter is fulcrumed at its lower end 50 to the stationary frame, and at its upper end 51 is jointed to the rear end of the rod 41. 55 55 are guide-plates projecting upward sufficiently to conduct the blank over the elevated folders 54 54. The next descent of the cross-head 19 causes the plunger 43 to carry the blank down into the mold 42, in which the box is formed. This mold consists of two bottom flap-folders and two end flap-folders, the latter with two inclined flanges each, arranged in combination so as to fold the box-blank around the plunger as the latter descends into the mold. The bottom flat-folders 54 54 are elevated a little above the others, so that the plunger first forces the box-blank between them in its downward movement, thereby folding the bottom flaps 52 52 up against the plunger. Then, as the plunger descends still further, the box-blank is forced between the side folders 56 56, which causes the sides of the box-blank 4 4 to fold also up against the plunger. The next operation consists of folding the end flaps 53 53 also around the plunger and over the bottom flaps 52 52, which latter are still held against the plunger by the long points of the end folders until the end flaps 53 53 are folded around sufficiently to retain the bottom flaps 52 52 in place. This folding of the end flaps 53 53 is done by the inclined flanges 56* 56* projecting from the side folders 56 56 at each corner of the mold. These flanges are so narrow that they do not extend
153 across or overlap each other, but project only a short distance around the ends of the box, leaving space enough between each opposite pair to admit the mechanism that inserts the wire-staples into the box. The flanges gradually assume a right angle with the side folders as they near the bottom, so that when the box is clear down into the mold the flaps 53 53 to form the ends of the box are bent around in position to receive the wire-staples. Each pair of opposite flanges are so inclined in relation to each other that the side flaps are folded around at the same time when their edges

are intended to meet flush, or one flange should be inclined a little in advance of the other if the side flaps are intended to overlap each other, as is the case in the form of box here represented. The box is now completely shaped and is held within the mold in readiness for the fastenings. The wire 57 is wound in continuous lengths on reels 58 58, Figs. 1 and 2, from which it is drawn by feed-rollers 59 59, driven intermittently by the mechanism shown in Figs. 11 and 12. This mechanism consists of a horizontal yoke-lever, 60, fulcrumed at its center 61, and inclosing a wrist-pin, 62, on the vertical shaft, 63, driven by bevel-pinions 64. (See Fig. 2.) The yoke of the lever 60, in which the wrist-pin 62 works, is formed with two shoulders, 65 66, with which the said wrist-pin engages alternately to move the lever in opposite directions. No effect is produced on the lever while the pin passes over the curves between the shoulders. A connecting-rod, 67, at the free end of the lever 60, is jointed to an arm, 68, carrying a pawl, 69, which engages with a ratchet-wheel, 70, on one of the roller-shafts, the two rollers of each pair being geared to turn together. It will thus appear that each forward movement of the lever imparts a slight rotary movement to the feed-rollers, and the parts are so constructed and proportioned that each movement will feed forward a length of wire sufficient to form a staple. One pair of feed-rollers, with their operating mechanism, may, as represented, feed all the wires used on one side of the machine. The operation of cutting, forming, driving, and clinching will be described with reference to a single staple, it being understood that this operation is performed simultaneously in two, four, six, or even more places, according to the dimensions of the box which the machine is at the time employed to make. The drawing shows appliances for applying four staples, two on each side. The mechanism for cutting, forming, and driving the staples is shown in Figs. 8, 9, and 10. A proper length of wire is severed and bent around a square mandrel, 71, by an annular punch, 72, formed to pass transversely over the mandrel 71, and having in its interior longitudinal grooves 73 (Figs. 9 and 10), which receive the wire as it is bent around the mandrel and hold the staple in proper position for driving. The reciprocating movement of the punch 72 is imparted by a cam, 74, upon the shaft, 63. Within the punch 72 is a sliding hammer, 75, which is held back by pins 76 77, and when released by the retraction of the pin 76, is driven forward by a spring, 78. The pin 77 projects from the hammer 75. The mandrel 71 and pin 76 are both attached to a crank-lever, 79, fulcrumed at 80, and moved back and forth by a cam, 81, on the shaft 63. As soon as the motion of this lever withdraws the mandrel 71 from before the staple, the latter being still held in position by the grooves 73, the pin 76 releases the pin 77, permitting the spring 78 to drive the hammer 75 forward with a sharp percussion on the staple, driving it through the two or three thicknesses of paper, and thus connecting the laps of the box. It is found that a sharp stroke is effective in driving thin wire through any necessary thickness of paper or pasteboard, though it would be impossible to effect this by mere pressure. The ends of the staples are received in suitable cavities in the edges of

26 striking the arm 27. The movement of these sliding plates is produced by levers 31 and 33, the former being fulcrumed at its center 32, and the latter at one end, 34, and the two being connected by a rod, 35. The forward end of the lever 31 is joined to a vertical lever, 36, which is fulcrumed to a stationary standard on the frame, and is operated by a stud, 37, on the cross-head 19, working in a slot in said lever 36. Lips 38, Figs. 1, 2, and 3, attached to the sliding plates 30, and projecting over the same within recesses 39, Fig. 4, in the sides of the feeder 21, insure the deposit of the blanks from the bottom of the plunger onto the plates 30. A spring, 40, is applied to the detent-pawl 13 to cause it to act promptly in arresting the motion of the shaft 9. The box-blank being deposited on the sliding plates 30, a sliding rod, 41, is moved forward, carrying the blank centrally over the mold 42 and beneath a plunger, 43, projecting downward from the center of the cross-head 19. The sliding rod 41 is then instantly drawn back. The motions of this sliding rod are effected by a cam, 44, on the main driving-shaft 15, working in a yoke-lever, 45, fulcrumed at 46 to the stationary frame and jointed at 47 to the forward end of a connecting-rod, 48, the rear end of which is jointed to a vertical lever, 49, which latter is fulcrumed at its lower end 50 to the stationary frame, and at its upper end 51 is jointed to the rear end of the rod 41. 55 55 are guide-plates projecting upward sufficiently to conduct the blank over the elevated folders 54 54. The next descent of the cross-head 19 causes the plunger 43 to carry the blank down into the mold 42, in which the box is formed. This mold consists of two bottom flap-folders and two end flap-folders, the latter with two inclined flanges each, arranged in combination so as to fold the box-blank around the plunger as the latter descends into the mold. The bottom flat-folders 54 54 are elevated a little above the others, so that the plunger first forces the box-blank between them in its downward movement, thereby folding the bottom flaps 52 52 up against the plunger. Then, as the plunger descends still further, the box-blank is forced between the side folders 56 56, which causes the sides of the box-blank 4 4 to fold also up against the plunger. The next operation consists of folding the end flaps 53 53 also around the plunger and over the bottom flaps 52 52, which latter are still held against the plunger by the long points of the end folders until the end flaps 53 53 are folded around sufficiently to retain the bottom flaps 52 52 in place. This folding of the end flaps 53 53 is done by the inclined flanges 56ª 56ª projecting from the side folders 56 56 at each corner of the mold. These flanges are so narrow that they do not extend
153 across or overlap each other, but project only a short distance around the ends of the box, leaving space enough between each opposite pair to admit the mechanism that inserts the wire-staples into the box. The flanges gradually assume a right angle with the side folders as they near the bottom, so that when the box is clear down into the mold the flaps 53 53 to form the ends of the box are bent around in position to receive the wire-staples. Each pair of opposite flanges are so inclined in relation to each other that the side flaps are folded around at the same time when their edges

are intended to meet flush, or one flange should be inclined a little in advance of the other if the side flaps are intended to overlap each other, as is the case in the form of box here represented. The box is now completely shaped and is held within the mold in readiness for the fastenings. The wire 57 is wound in continuous lengths on reels 58 58, Figs. 1 and 2, from which it is drawn by feed-rollers 59 59, driven intermittently by the mechanism shown in Figs. 11 and 12. This mechanism consists of a horizontal yoke-lever, 60, fulcrumed at its center 61, and inclosing a wrist-pin, 62, on the vertical shaft, 63, driven by bevel-pinions 64. (See Fig. 2.) The yoke of the lever 60, in which the wrist-pin 62 works, is formed with two shoulders, 65 66, with which the said wrist-pin engages alternately to move the lever in opposite directions. No effect is produced on the lever while the pin passes over the curves between the shoulders. A connecting-rod, 67, at the free end of the lever 60, is jointed to an arm, 68, carrying a pawl, 69, which engages with a ratchet-wheel, 70, on one of the roller-shafts, the two rollers of each pair being geared to turn together. It will thus appear that each forward movement of the lever imparts a slight rotary movement to the feed-rollers, and the parts are so constructed and proportioned that each movement will feed forward a length of wire sufficient to form a staple. One pair of feed-rollers, with their operating mechanism, may, as represented, feed all the wires used on one side of the machine. The operation of cutting, forming, driving, and clinching will be described with reference to a single staple, it being understood that this operation is performed simultaneously in two, four, six, or even more places, according to the dimensions of the box which the machine is at the time employed to make. The drawing shows appliances for applying four staples, two on each side. The mechanism for cutting, forming, and driving the staples is shown in Figs. 8, 9, and 10. A proper length of wire is severed and bent around a square mandrel, 71, by an annular punch, 72, formed to pass transversely over the mandrel 71, and having in its interior longitudinal grooves 73 (Figs. 9 and 10), which receive the wire as it is bent around the mandrel and hold the staple in proper position for driving. The reciprocating movement of the punch 72 is imparted by a cam, 74, upon the shaft, 63. Within the punch 72 is a sliding hammer, 75, which is held back by pins 76 77, and when released by the retraction of the pin 76, is driven forward by a spring, 78. The pin 77 projects from the hammer 75. The mandrel 71 and pin 76 are both attached to a crank-lever, 79, fulcrumed at 80, and moved back and forth by a cam, 81, on the shaft 63. As soon as the motion of this lever withdraws the mandrel 71 from before the staple, the latter being still held in position by the grooves 73, the pin 76 releases the pin 77, permitting the spring 78 to drive the hammer 75 forward with a sharp percussion on the staple, driving it through the two or three thicknesses of paper, and thus connecting the laps of the box. It is found that a sharp stroke is effective in driving thin wire through any necessary thickness of paper or pasteboard, though it would be impossible to effect this by mere pressure. The ends of the staples are received in suitable cavities in the edges of

the plunger 43. The mechanism for clinching or bending over the ends of the staples is represented in Figs. 5, 6, and 7. Figs. 5 and 6 show the positions of the parts when the staples are driven and before they are clinched. Fig. 7 shows the position when they are clinched. On the head of the vertical shaft 63 is a disk or wheel, 79*, from the upper surface of which project two pins, 80* and 81*, which operate a rock-shaft, 82, mounted horizontally in bearings under the cross-head. This rock-shaft has a pair of tappets, 83 and 84, on which the pins 80* and 81* act successively. Upon the shaft 82 are rigid arms 85 87, projecting in opposite directions, and each connected to a slider, 86 88, which two sliders constitute the plunger 43. 89 and 91 represent horizontal lugs on the slider 86, and 90 and 92 similar lugs on the slider 88. These lugs are arranged alternately as represented, so that the motion of the shaft 82 in one direction, by depressing the slider 86 and elevating the slider 88, withdraws the two lugs 89 and 90 toward each other, and the two lugs 91 and 92 toward each other. As soon as the downward stroke of the cross-head 19 has formed the box within the mold, and the staples have been driven in the manner explained, one of them with its ends between the lugs 89 and 90 and the other with its ends between the lugs 91 and 92, the rotation of the shaft 63 throws the pin 80 against the tappet 83, rocking the shaft 82 in one direction, bringing togetlrer each pair of lugs, 89, 90, and 91 92, so as to bend the two ends of each staple toward each other and effectually secure them. This position of the parts is shown in Fig. 7. The subsequent contact of the pin 81 with the tappet 84 rocks the shaft in the other direction, so as to open or separate the lugs in readiness for the next operation. A spring, 93, catching over the top of the box, prevents it rising with the plunger, and when the plunger again descends with a new blank the previously-finished box is expelled through the bottom of the mold.

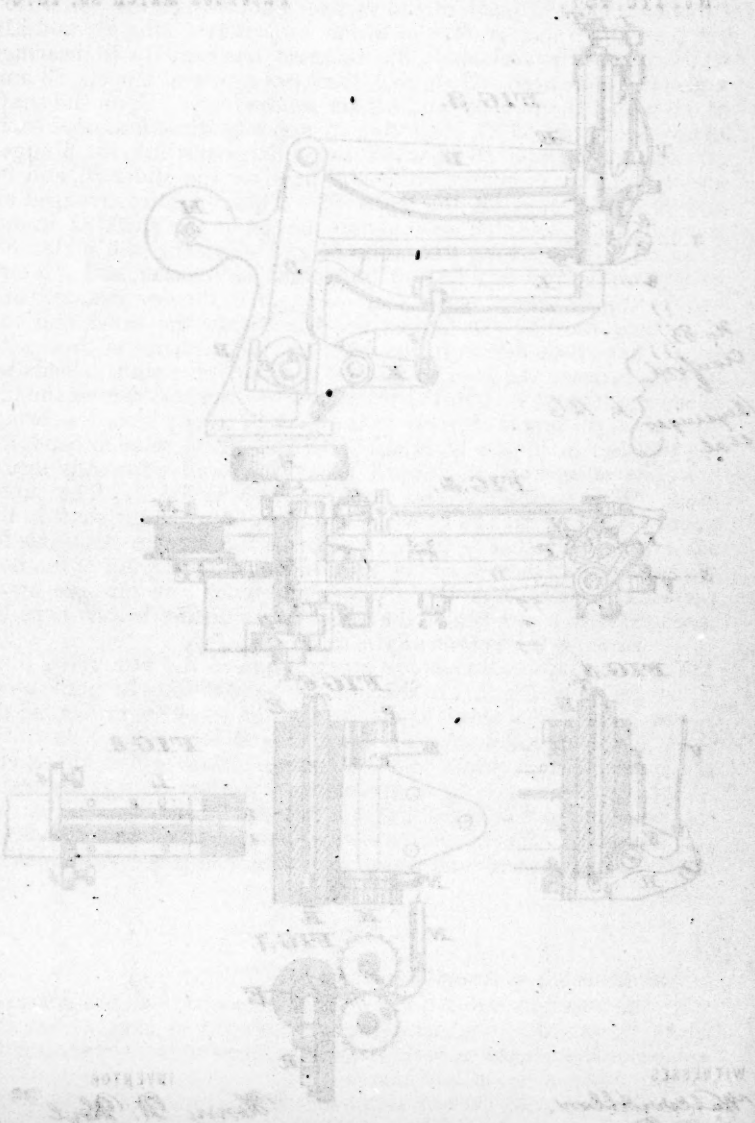
154 A modification in the construction of the plunger is illustrated in Fig. 2. In this case the body of the plunger is made in one piece with a single slider working in it. The motion of the shaft in one direction throws down this slider to bend down the upper part of each staple, and the reverse motion opens the cavity as before. This opening of the cavity is performed directly before the action of the hammer 75, and is followed by the clinching action just described. The elevation of the plunger itself then bends up the lower member of each staple and thus completes the clinching action.

Claims.

The following is claimed as new:

1. The blank-holder 5 6 and graduated counterbalance device 8 9 10 11 12, combined and arranged substantially as herein described to elevate the blanks as required with a force varied proportionally to the height of the pile of blanks.

2. The detent 13 14, and automatic device for temporarily releasing the same, substantially as set forth.



2 Sheets—Sheet 1.

H. R. HEYL.

FORMING AND INSERTING WIRE STAPLES IN PAPER BOXES.

No. 175,457. Patented March 28, 1876.

No. 82. Crawford & Heyssiger et al. p. 155

FIG. 1.

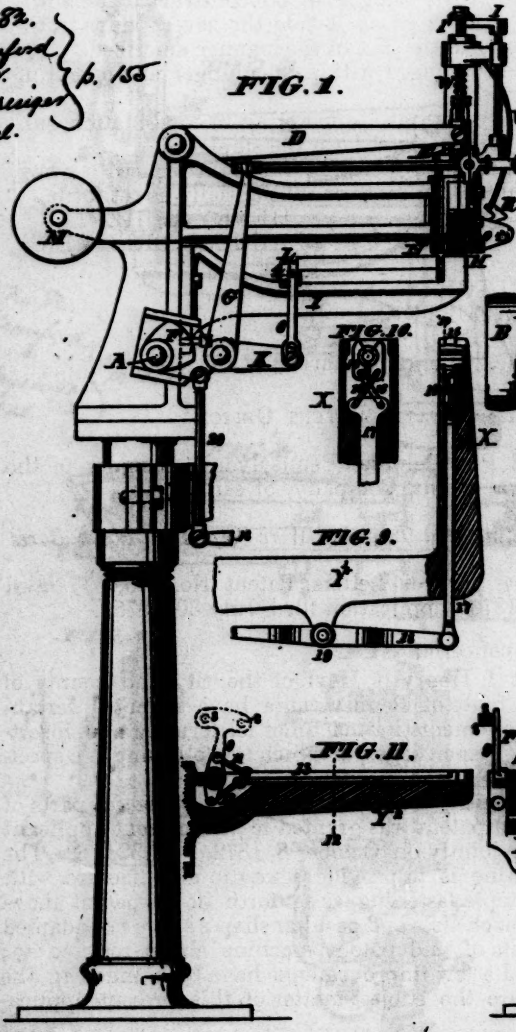


FIG. 2.

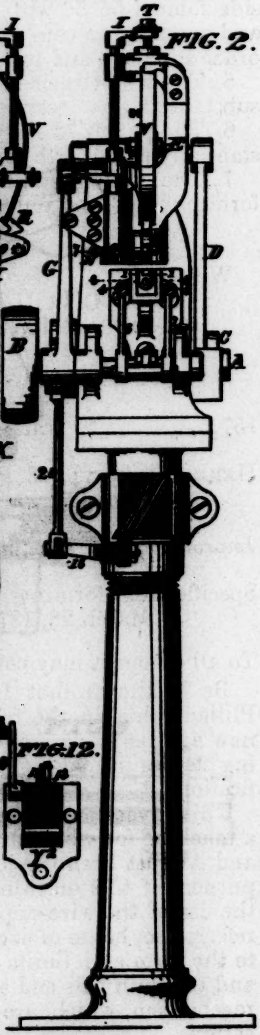


FIG. 10.

FIG. 9.

FIG. 11.

FIG. 12.

WITNESSES

Walter Allen

H. P. Palmer

INVENTOR

Henry R. Heyl

By Knight Bros Attorneys.

3. The feeder 21, constructed with one or more cavities in its face, connected with a pipe for exhausting the air, in combination with the valve or valves operated by the descent and ascent of the feeder by mechanism, substantially as herein described.

4. The box-mold consisting of the elevated end folders 54 54, and side folders 56 56 with their flanges 56^a 56^a constructed as shown, and arranged in combination so as to fold the several flaps in the order specified, and to form the box in the manner described.

5. The wire-clinchers arranged within the plunger, and operating substantially as described.

6. The punch 72 and mandrel 71, operating in combination, substantially as set forth, to sever and form the staples.

7. The sliding hammer 75, operating in connection with a box, forming mold and plunger, in manner substantially as set forth.

HENRY R. HEYL.
AUGUST BREHMER.

Witnesses:
JOHN CHARLTON.
E. OSCAR HAEUPTNER.

(Here follow diagrams marked p. 155, 156.)

157 UNITED STATES PATENT OFFICE.

HENRY R. HEYL, of Philadelphia, Pennsylvania, assignor to the Novelty Paper-Box Company, of same place.

Improvement in Forming and Inserting Wire Staples in Paper Boxes.

Specification forming part of Letters Patent No. 175,457, dated March 28, 1876; application filed July 30, 1875.

To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful improvements in machines for forming and inserting staples in making paper boxes, of which the following is a specification:

This invention is chiefly a modification of the essential parts of a machine for which a patent was granted to the present applicant and August Brehmer jointly on October 8, 1872, No. 132,078. The purpose of this machine is to provide a way to manufacture, with the use of the wire-staple fastening, as set forth in the patent above referred to, boxes of such sizes and peculiar shapes as are not adapted to the form and limits of said patent machine above referred to; and to attain this end a few improvements have been made in the mechanism, which are the subject-matter of this present application.

In the accompanying drawings, figure 1 is a side elevation of my improved machine. Fig. 2 is a front view of the same. Fig. 3 is a view of the opposite side from that shown in Fig. 1. Fig. 4 is a plan

view. Fig. 5 is a vertical section of the plunger and its accessories on the line 5, Fig. 4. Fig. 6 is a vertical section of the same in a plane at right angles to the above. Fig. 7 is a horizontal section on the line 7, Figs. 2 and 3. Fig. 8 is a horizontal section on the line 8, Figs. 2 and 3. Fig. 9 is a sectional elevation of a modified form of clincher and its accessories, viewed from the side, Fig. 1 showing also a part of the attaching bracket of this clinching mechanism. Fig. 10 is a vertical section on the line 10, Fig. 9. Fig. 11 is a vertical longitudinal section of a clinching mechanism similar to that which is described in the original patent of Heyl & Brehmer, and which may be applied to the present machine, as hereinafter described. Fig. 12 is a transverse section on the line 12, Fig. 11.

By reference to the drawings it will be seen that the plunger and forming-mold of the original machine are dispensed with, and that the hand must perform the labor of folding the box-blank into the required form, and of placing the parts which are to receive the wire-staple fastening into position between the staple forming and driving device and the clinching device. This process of making boxes, although a somewhat slower one than when they are made by the thoroughly automatic machine, is nevertheless of great advantage in the construction of boxes of large dimensions, which must generally be made from several pieces of paste-board in order to use material economically.

By these same means we are also enabled to construct boxes of peculiar shapes, which to be made on an automatic machine would necessitate an impracticable complication of the parts of the machine. Thus we find the machine which is the subject of this application to be indispensably necessary in the making of all the varieties of boxes required.

The working parts of the machine are mounted upon a pedestal to bring them to a convenient height before the operator, who sits on a high stool in front of the machine, with a pile of box-blanks conveniently placed at his side. The whole mechanism derives motion in proper time through the main shaft A, which is driven by power applied to the pulley B. To the main shaft are fixed two cam-wheels, one marked C, giving movement to the lever D, which operates the wire-cutter E, and the other, marked F, operating through the lever G, the wire-feeding device H, and the hammer-lock I, and, through the lever K, the clinching device L.

The operation of the machine is described as follows: The wire used to form the staple fastening is placed upon a spool, preferably hung on a stud at M. The wire leading to a bent tube, N, is drawn by pressure between the feed-rollers O O, and by them pushed forward directly under the cutting-tube E, the length of wire fed being controlled by the uniform movement of lever D operating the ratchet P, which is fixed on the shaft of one of the feed-rollers O. As the cutter-tube E is forced downward the wire is cut off and bent over the bending-hook R, in the position shown in Fig. 6, forming thus a staple in the tube E, with its points directed down-
158 ward. This bending-hook is formed with a V-notch at the

point where the wire is to be bent over it, which serves the purpose of a guide to bring the wire under the center of the cutting-tube, so that when the staple is formed it can pass with accuracy into the fine grooves on the inside of the cutting-tube E, which serve as guides in directing the staple into the paste-board. As the tube E continues its descent, the shoulder S in the tube E presses against the bending-hook R below its pivot, and pushes it out of position, so that, at the proper time, the hammer T may drive down through the tube E, and drive the staple into the box lying below the end of the tube E and on top of the clinchers L. The return movement of the bending-hook is compelled by the spring V, which is also stiff enough to hold the bending-hook firmly while the wire is being bent over it. As the staple is driven by percussion, making its own holes through the paste-board, the hammer T is driven down by the spring W as soon as it is released by the withdrawal of the lock I. The return upward of the tube E carries the hammer T also with it, so that no separate device is employed to withdraw the hammer, as in the original machine referred to. As soon as the hammer is carried up to its highest point the lock passes under its head and retains it until its force is again required to drive another staple, when the lock swings out and the hammer is allowed to strike downward with the full force of the spring.

The clincher L, which turns the points of the staple on the inside of the box, is connected with the lever K and cam-wheel F, and is a modification of the original form of clincher, being adapted to clinch the wires at right angles to the bracket Y, which supports the clinching device. The clincher proper consists of two jaws, 1 1, Figs. 2 and 8, one attached to a hollow sleeve, 2, and the other to a shaft, 3, within said sleeve, the sleeve and shaft having arms 4 5 projecting in opposite directions, and connected by rods 6 7 with the lever K.

In Figs. 11 and 12 I have shown a clinching mechanism similar to that described in the Heyl and Brehmer patent already referred to, but adapted to work horizontally instead of vertically, the staple being in this instance driven vertically instead of horizontally, as in the old machine. The bracket Y^2, carrying the clinching mechanism shown in Figs. 11 and 12, is attached in the place of the bracket Y, and is worked by the contact of the lever G with studs 8, on a lever, 9, fulcrumed at 10, and connected by links 11 12 with the clincher-slides 13 14.

Still another modification of the clincher is in the form of a post with nippers 15 at the top, as shown at X, Figs. 9 and 10. This post forms part of a bracket, Y^1, which connects it to the pedestal, as shown in Fig. 1. The nippers 15 are connected by links 16 to a vertical rod, 17, jointed to a lever, 18, which is fulcrumed at 19 to the bracket Y^1, and actuated through a rod, 20, from the lever K.

The object of the clinching device last described is to clinch staples at the bottoms of deep boxes which cannot be reached by either of the other forms of clinchers shown.

The following is claimed as new:

1. The combination of the pivoted forming-hook R and annular

cutting-tube E, constructed and operating substantially as and for the purposes set forth.

2. The bending-hook R, connected with a V-shaped notch to receive the staple, in combination with the internally-grooved cutting-tube E, operated substantially as and for the purpose described.

HENRY R. HEYL.

Witnesses:
OCTAVIUS KNIGHT.
WALTER ALLEN.

(Here follow diagrams marked pp. 159, 160, 161, 162, 163, & 164.)

165 UNITED STATES PATENT OFFICE.

HENRY R. HEYL, of Philadelphia, Pennsylvania, assignor to the Novelty Paper Box Company, of same place.

Improvement in Machines for Forming, Inserting, and Clinching Staples in Books.

Specification forming part of Letters Patent No. 183,670, dated October 24, 1876; application filed September 26, 1876.

To all whom it may concern:

Be it known that I, Henry R. Heyl, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful improvements in machines for forming, inserting, and clinching staples in the backs of books and other articles, of which the following is a specification:

This invention is supplementary to certain inventions in wire-stapling machines for which patents have been granted as follows: To Henry R. Heyl and August Brehmer, October 8, 1872, No. 132,078, and to Henry R. Heyl, March 28, 1876, No. 175,457.

The present invention is designed to insert staples of heavier wire in such thicker books or other articles as are beyond the capacity of the former machines patented, as aforesaid, which I employ to staple thin books, as well as paper boxes.

The main features of the within-described improvement consist in the employment, in combination with the staple forming and inserting mechanisms, of rapidly-rotating drills to make holes in the book or other article to receive the staples; in a combination of feed-rollers, some of which rotate intermittingly and others continuously, to pass the book through the machine—first, space by space, to receive the staples, and then to deliver it out of the machine; and in details of construction and modifications, too fully hereinafter set forth to need preliminary description.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a perspective view of the machine; Fig. 2, a perspective view from the front of the perforating mechanism; Fig. 3, a similar view from the rear of the wire-feeding, staple-forming, inserting, and clinching mechanisms; Fig. 4, a longitudinal section

159

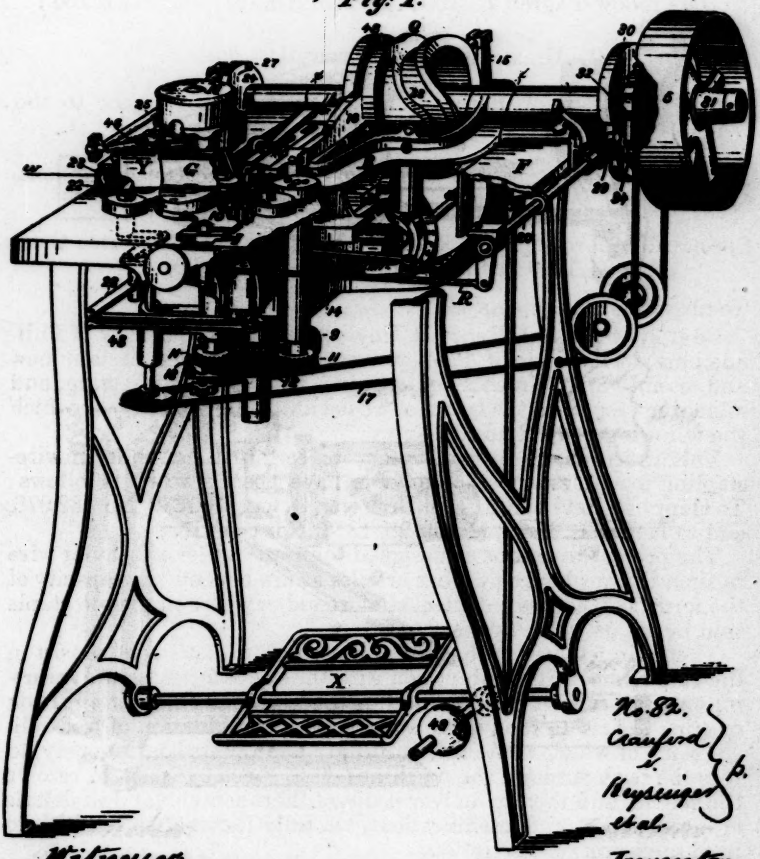
6 Sheets—Sheet 1.

H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.

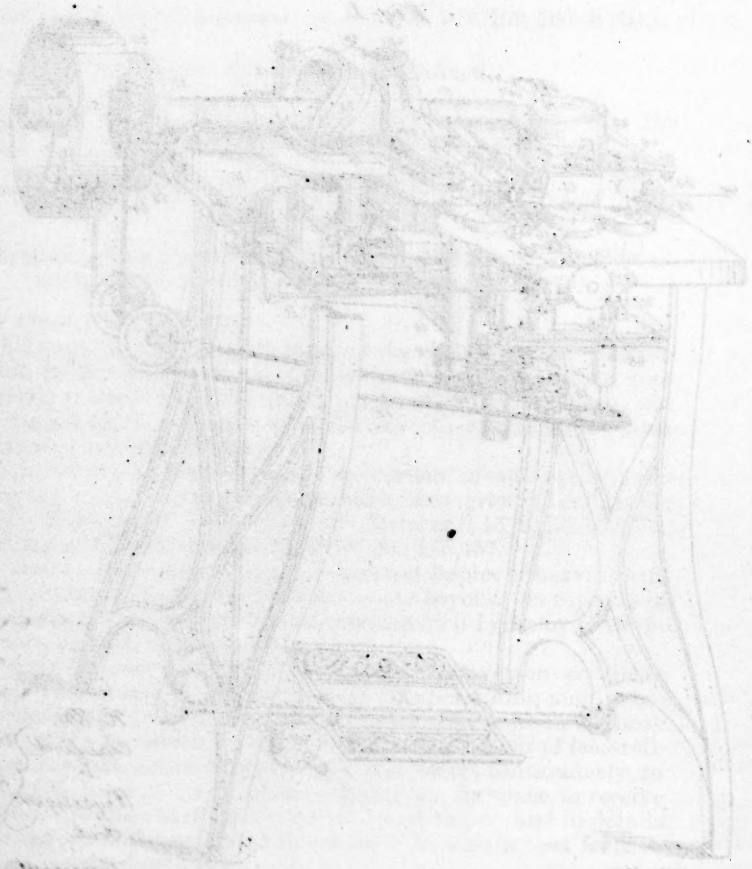
Fig. 1.



No. 82. Crawford v. Heysinger et al. p. 159

Witnesses:
Lellen Lodtke
John C. Kluber

Inventor
Henry R. Heyl,
by Munson & Philipp.
his Attorneys.



160

6 Sheets—Sheet 2.

H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.

Fig: 2.

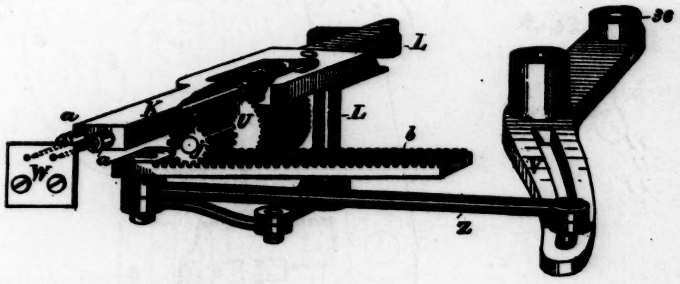
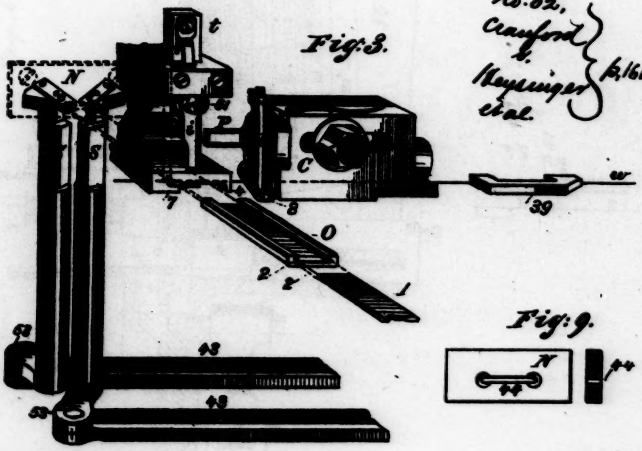


Fig: 3.



No. 82, Crawford v. Heysinger et al. p. 160

Fig: 9.

Witnesses:

Lucien A. Wait

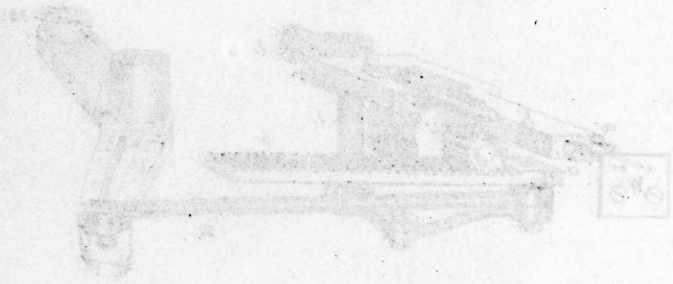
John A. Huber.

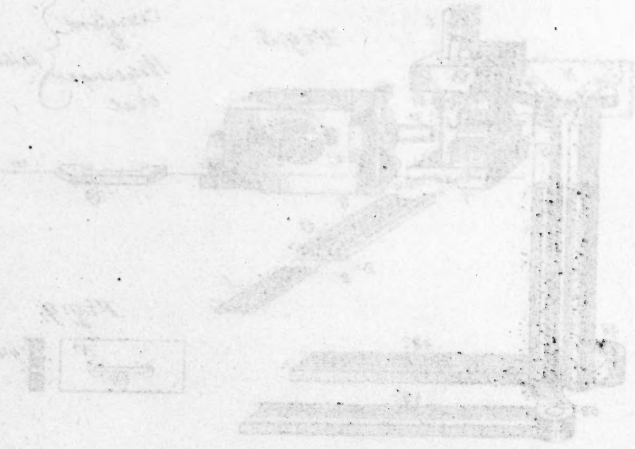
Inventor:

Henry R. Heyl.

by Munn & Co.

Attorneys.





161

6 Sheets—Sheet 3.

H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.

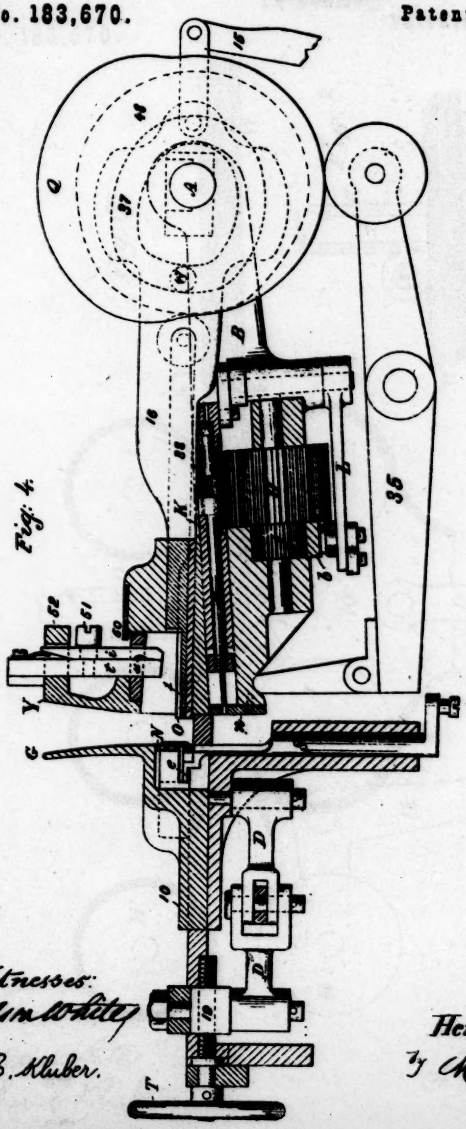


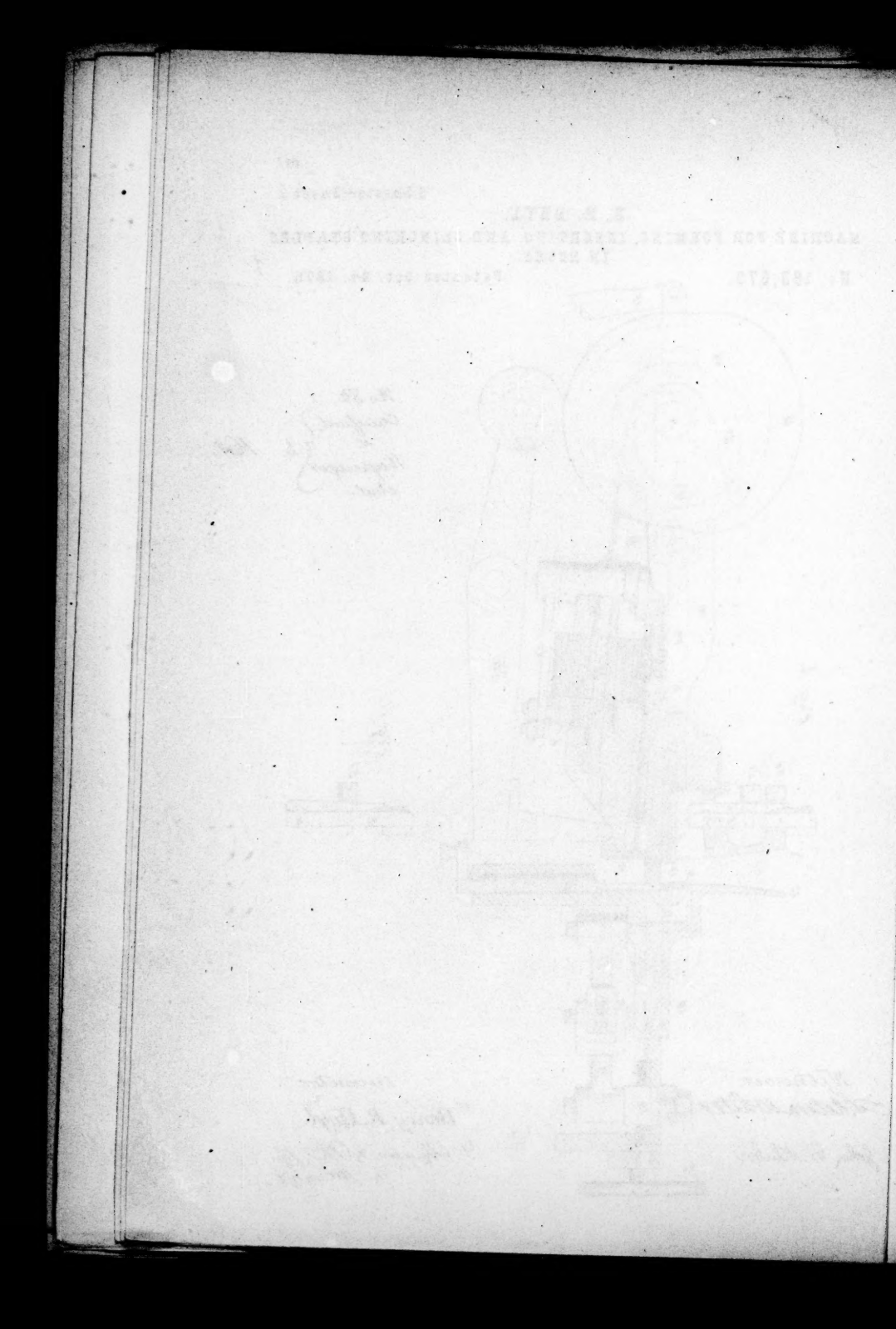
Fig. 4.

Fig. 11.

No. 82. Crawford v. Reysinger et al. p. 161.

Witnesses:
Chelsea White
John C. Kluber.

Inventor:
Henry R. Heyl,
by Munson & Philipp,
his Attorneys.

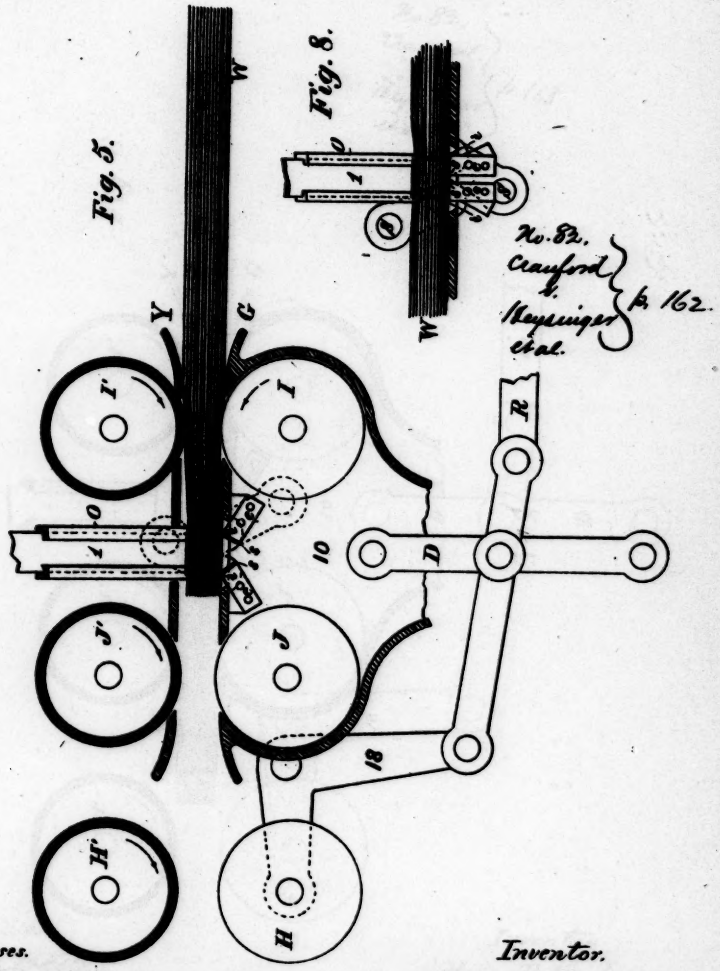


6 Sheets—Sheet 4.

H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.



Witnesses.

Shellm Wolitzky

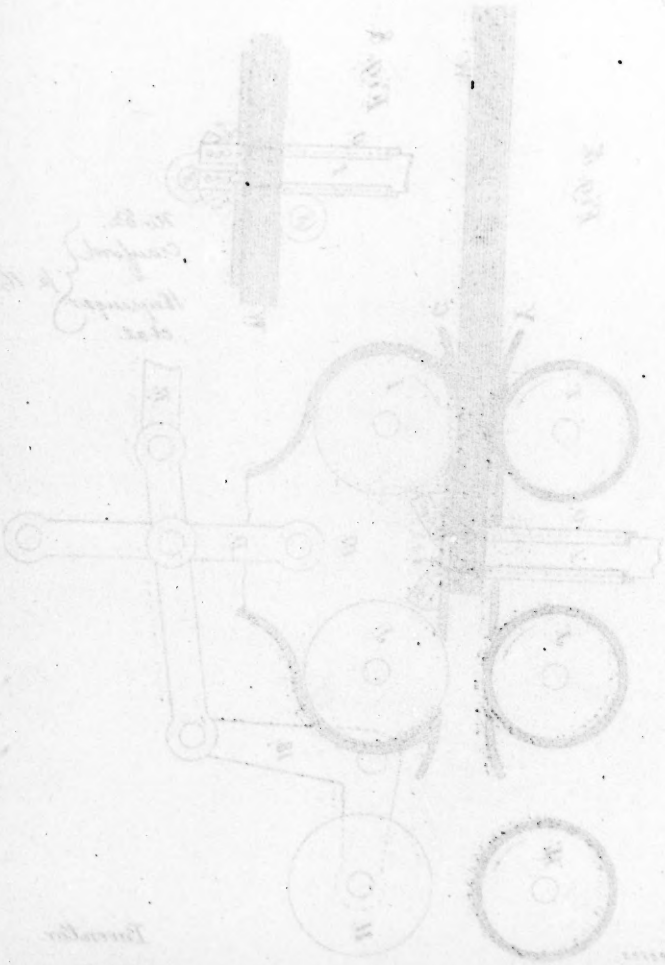
John C. Huber.

Inventor.

Henry R. Heyl,

by Munson & Philipp.

Attorneys.



6 Sheets—Sheet 5.

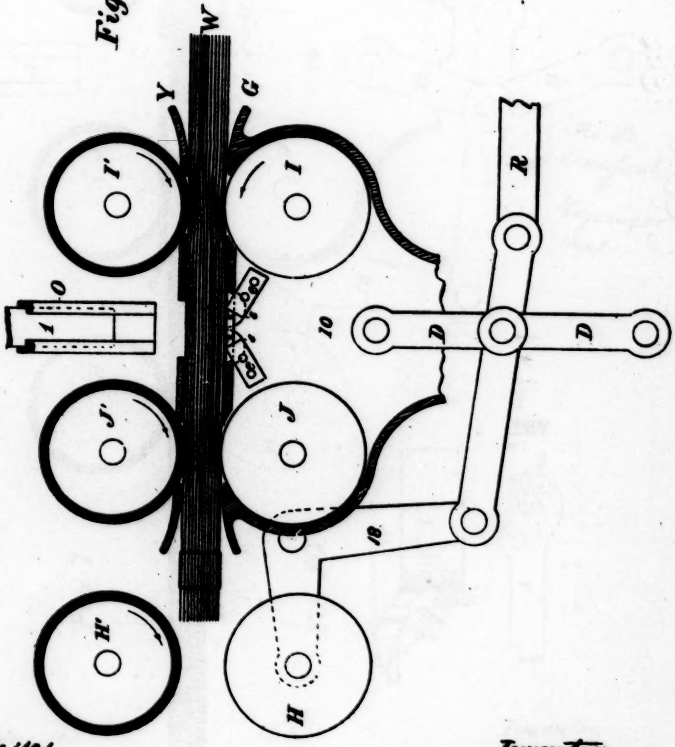
H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.

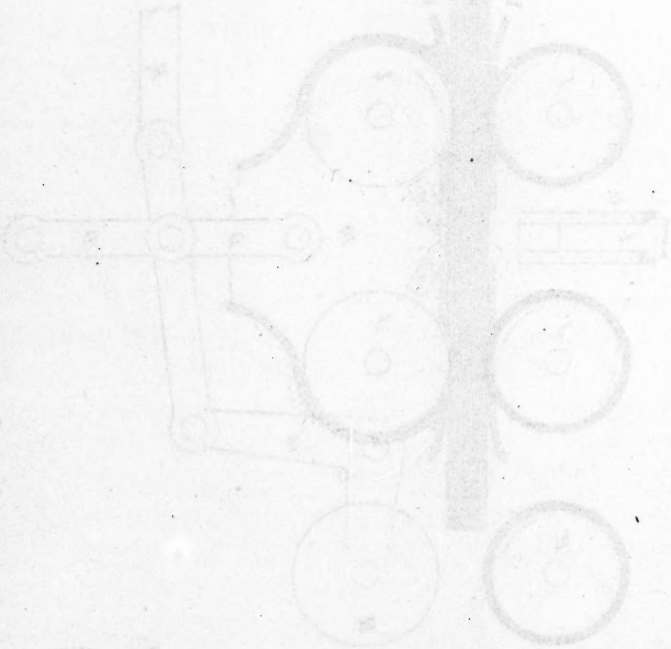
No. 82. Crawford & Heyssinger et al. p. 163

Fig. 6.



Witnesses.
Wm. Wallace
John L. Kluber.

Inventor,
Henry R. Heyl.
by Munn & Philipp
his Attorneys.



6 Sheets—Sheet 6.

H. R. HEYL.

MACHINE FOR FORMING, INSERTING, AND CLINCHING STAPLES IN BOOKS.

No. 183,670. Patented Oct. 24, 1876.

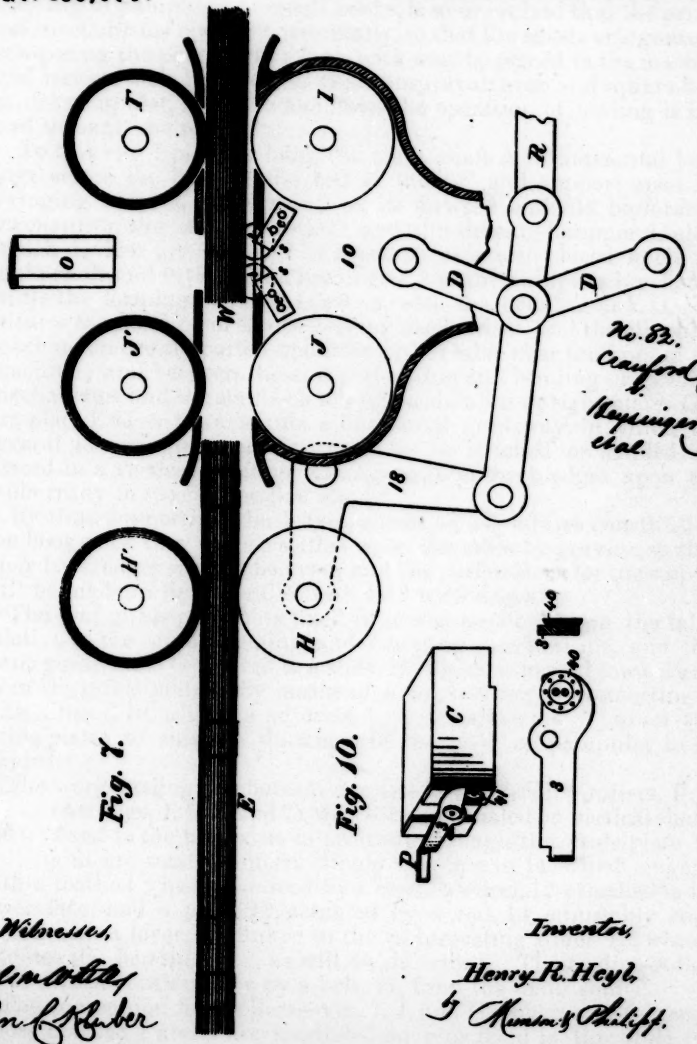
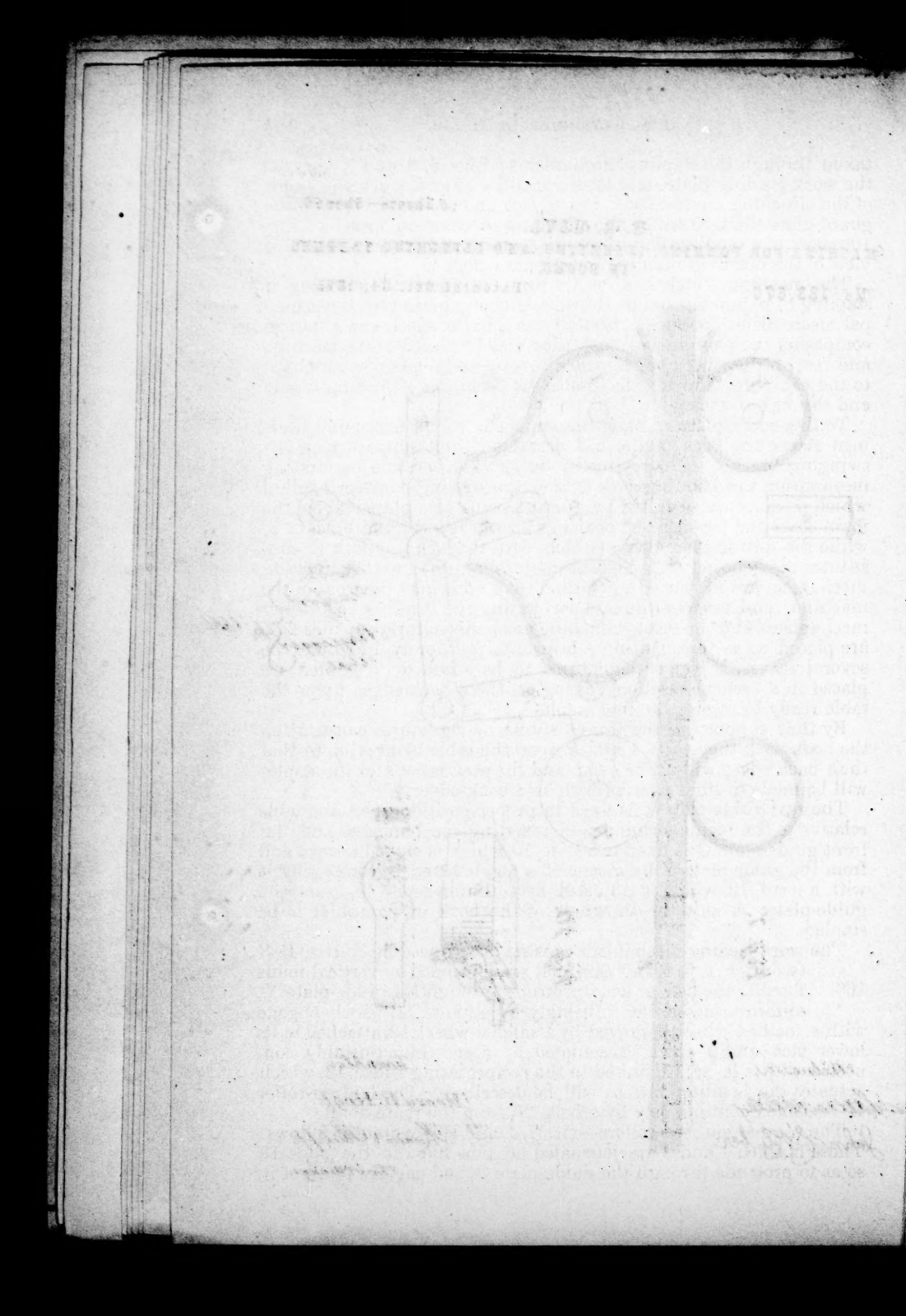


Fig. 1.

Fig. 10.

Witnesses,
Wm. A. Whittlesey
John L. Huber

Inventor,
Henry R. Heyl,
by Munn & Philipp,
his Attorneys.



taken through the stapling mechanisms; Figs. 5, 6, and 7, views of the work-guiding plates and feeding-rollers; Fig. 8, a detached view of the clinching mechanism; Fig. 9, face and sectional views of the guard-plate through which the clinching mechanism operates; Fig. 10, views of a modification of the wire-cutting apparatus; Fig. 11, a view of the bending-mandrel and nipper detached.

The machine, which has for its primary object the stitching or stapling of pamphlets or small books, is so organized that the principal mechanisms operate horizontally, so that the sheets or signatures composing the pamphlet or book pack may be placed in the machine and rest on their back edges, which insures an even and square back to the pamphlet, and also facilitates the operation of feeding it into and through the machine.

To this end I place or hang the main shaft A in horizontal bearings across the back of the bed or table F, and support upon it a swinging bracket, B, carrying in its forward end the perforating mechanism, the bending fork O, and the driving-hammer 1, all of which devices are operated by a set of cams also placed upon the main shaft and between the bearings *x x* of the swinging bracket B, while the forming-mandrel *t* (which, with the bending-fork O, constitutes the bending or staple-forming mechanism) and the clinching mechanism are supported upon the bed or table near the front of the machine; and between the said perforating and bending or forming mechanisms and the staple-clinching mechanism upright plates G Y are placed, so as to constitute a horizontal guideway, in which the several leaves, sheets, or signatures to be stitched or stapled are placed in a vertical position, resting on their back edges upon the table ready to receive the first staple.

By thus supporting the leaves, sheets, or signatures constituting the book-pack they will be settled upon the table by gravity, so that their back edges will all be even, and the perforations for the staples will be made in lines parallel with said back edges.

The rear guide-plate Y is fixed in proper position upon the table relative to the staple forming and inserting mechanisms, and the front guide-plate G is fixed to a slide, 10, which is moved toward and from the guide-plate Y by means of a toggle-lever, D, connecting it with a head, 19, which is adjusted by a thumb-screw, T, to set the guide-plates to suit the thickness of the book or pamphlet to be stapled.

The work-feeding mechanism consists of two feeding-rollers, I′ J′ (see Figs. 1, 5, 6, and 7), which are journaled on vertical shafts
166 fixed to the bed, so as to protrude through the guide-plate Y, and are rotated intermittingly by pinions 11, which engage with a toothed wheel, 9, moved by a ratchet-wheel, 12, attached to its lower face, and a pawl, 13, actuated by a rod, 14, adjustably connected with a lever, 15, linked to the reciprocating slider 16, which actuates the bending-fork, as will be described. The feeding-roller H′ is driven continuously by a belt, 17, from the main shaft.

The companion feed rollers—viz., I, J, and H—operate as follows: Those marked I and J are journaled on pins fixed in the slide 10, so as to protrude through the guide-plate G, and partake of all of its

movements imparted by the toggle-lever D, and the feed-roller H is hung in the end of a bell-crank lever, 18, linked to said toggle-lever D.

The feed-rollers H′, J′, and I′ are provided with rubber tires, which construction insures more perfect frictional contact with the book-pack.

The slide 10 is moved forward and back by the toggle-lever D, which is connected to a rod, R, reciprocated by the rock-shaft 20, as will be described.

In the position of this feeding mechanism shown in Fig. 6, which is that occupied by it during the operation of setting and clinching staples, the slide 10 has been moved forward, so as to cause the feeding-rollers I I′ and J J′ to firmly compress the book between them.

As the rollers I′ and J′ are rotated intermittingly the book will be fed forward a proper distance and come to a state of rest, when a staple will be inserted through it, as will be presently explained. The next movement of the feed-rollers will carry the book onward a proper distance, and this operation will be continued as long as the feed-rollers are in the position shown in Figs. 5 and 6. The position of the feeding mechanism (shown in Fig. 7) is that occupied by it when a book-pack has just been inserted, and the book, just stapled, is leaving the machine. The slide 10 has been moved back by the toggle-lever D, which, at the same time, has carried the roller H forward, so as to press the stapled book between it and the constantly-revolving roller H′, the contact of the two propelling the book out of the machine.

Thus the feeding-rollers I I′ and J J′ are brought into position to press the book between them, and are rotated intermittingly between the times that the successive staples are inserted into the book to feed the book along, space by space, until the desired number of staples are inserted in it, when the rolls are separated to release the stapled book, and the feed-roller H′ is carried forward to press the said book between it and the constantly-revolving feed-roller H′ and deliver it out of the machine, during which operation the pack of sheets or signatures for a new book is inserted between the guide-plates G Y, which now stand apart and present a space considerably greater than the thickness of the book-pack which they have been adjusted to receive.

Thus the entire operation of feeding the book-pack for the spacing of the staples, and for carrying the book out of the machine when the stapling has been completed, is performed by these feed-rollers, leaving only for the operator the work of inserting the book-pack in its first position between the guides G Y, which mechanism renders the machine more efficient and rapid than if the entire movement of the book had to be managed by the hand, while the stapling is more uniform and neat.

The perforating mechanism, Fig. 2, consists of a pair of rotating drills, whose spindles or stocks *a a* are supported in a reciprocating carrier, K. The rotary, as well as the reciprocating, movements of these drills are accomplished simultaneously, their reciprocation being effected through the medium of grooved cam 33, in which

runs a roller, 36, on a lever, V, which latter is connected, by a rod, Z, with a bell-crank, L, which reciprocates the carrier K in its longitudinal bearings in the forward end of the swinging bracket B; and their rotation is effected through a rack, *b*, reciprocated by the connecting-rod Z meshing into a small pinion, *j*, which is joined to the toothed wheel U, from which, by direct gearing with small pinions on each drill stock or spindle, the latter are rotated. The toothed wheel U has such a width of face that, as the drill stocks or spindles are reciprocated, their pinions are not disengaged from the teeth of the said wheel U.

This combination of rack and pinions gives to the drills a high rotary speed at the same time that, through the medium of the bell-crank lever L, the drill-stock carrier K is moved forward, forcing the drills through the book-pack that stands between the guide-plates G Y. The reverse motion of the lever V also reverses the drills, and draws back the drill-stock carrier, which gives place to the stapling mechanism to insert the staple in the holes just made by the drills and drive it into the book-pack. By using rotating drills instead of puncturing-awls a great saving of strain is attained, and, consequently a much smaller drill can be used, for it has much less thrust-pressure to bear. Besides, the drill will always make a straight hole, whereas a non-rotatiug awl will follow any inclination of its point should it be ever so slightly bent or not centrally ground; but these slight imperfections do not affect the perfect working of a revolving drill.

The wire-feeding mechanism consists of two wheels having polished furnaces, one of which, 22, is shown in Fig. 1. These wheels are hung on vertical shafts, upon which are fixed gear-wheels, 23, meshing together so as to revolve in unison. One of the vertical shafts is driven intermittingly by means of a ratchet-wheel, 46, and a pawl engaging therewith, which pawl is operated by a lever connected with the wheel 24 by arm 25. The wire *w* is directed
167 through a guiding-eye and between these feeding-wheels; thence through a straightening-plate, 39, Fig. 3, through the cutter-block C and between the cutters, and thence passes through a slot in plate 6, and protrudes beyond the forming mandrel, where it rests in an eye, *u*, of a nipper, *i*, across the face of the forming-mandrel *t*. A proper length of wire to form a staple is fed forward to this position at each movement of the feed-wheels.

The cutting mechanism, Fig. 3, consists of a plate, 8, fixed to the front end of the cutter-block C, and a cutter-blade, *l*, depending from a stock, 3, pivoted so as to vibrate upon the end of the cutter-block C. The wire passes through a perforation in the plate 8, and lies just in front of the blade *l*, which is pressed against it to sever the wire by the swinging bracket B striking a lug, P, projecting from the blade-stock 3, and thus rocking it upon its pivot as the said bracket rises, to present the perforating-awls in operative position. The stapling mechanism consists of a forming-mandrel, a bending-fork, a driver, and clinchers, all of which will be separately hereinafter described.

In its raised position the swinging bracket B supports the staple-

bending fork O in operative position, with respect to the forming-mandrel *t*, which is held in a head-block, 52, rising from the table of the machine, and is provided with a spring-seated nipper, *i*, having an eye, *u*, which receives the staple length of wire, and prevents it from dropping or jumping when it is cut off, and also holds it in proper position to be operated upon to form it into a staple.

The bending fork O, as shown, is a long narrow metal plate, furrowed out to form longitudinal grooves 2 in its inner side walls. It thus has a forked end, which, as it moves forward, strikes the wire, which is supported between the extreme ends of the nipper *i* and forming-mandrel *t*, as in Fig. 11, and bends it into the form of a staple around the forming-mandrel *t*, the legs of said staple lying in the longitudinal grooves 2 of the bending-fork. This bending-fork is at the end of a slider, 16, and lies directly over the reciprocating drill-stock carrier, and as close thereto as is possible, so as to avoid any unnecessary up-and-down motion of the swinging bracket B. The slider 16 is mortised, so as to slide upon the shaft A, and has a a reciprocating motion imparted to it by means of the cam 48, which has a grooved face, 37, which receives a friction-roller, 47. When the drills have perforated the book, and the bending-fork has formed the wire into a staple around the mandrel *t*, the swinging bracket B drops down to the position shown in Fig. 4. The staple, as it is formed, lies in the grooves on the inner sides of the bending-fork O, and as the latter is moved down with the swinging bracket B it strips the staple from off the end of the forming-mandrel, the spring-seated nipper *i* giving way to permit its passage. The staple now lies within the end of the bending-fork in position to be inserted into the book-pack. The bending-fork O still continues to move forward until its end reaches the book-pack, by which time the swinging bracket B is down to its lowest position, and the staple-legs stand close to the holes in the book, ready to be driven.

The driving mechanism consists of a hammer, 1, guided in the grooves 2 of the bending-fork, and operated by cam 48. It strikes the staple from behind, and forces it through the book-pack, the projecting legs of the staple passing through an opening, 44, in the guard-plate N, Fig. 9, which is a portion of the front guide G. This opening in the guard-plate N is a narrow slot, 44, with two countersunk enlargements in it at points opposits to the entrance of the staple-legs, through which the staple-legs pass, and as these staple-legs are bent around toward each other, and flat against the book, the narrow slot between the countersunk enlargements serves as a guide to direct the wires in a straight line toward each other.

The clinching mechanism, which bends the projecting legs of the staple flat against the book, is formed of two shafts, S, lying close to each other, and having about a quarter-turn motion in opposite directions, as if they were geared together. These shafts are actuated by a tappet, 27, on the face of the wheel 24, which rocks a lever, 28, connected by means of rods 43 with the cranks 53 on the lower ends of the shafts. The upper ends of these shafts are milled off, to allow them to pass up behind the slotted guard-plate N, while at the same time their centers are directly under and in line with the face of the

said plate N. Two thin clincher-plates, *e e*, are mounted on the top ends of these shafts; but they might be a part of the shafts, were it not that they need to be of hardened steel, while the rest of the clincher-shafts are made preferably of untempered metal. The corners *r r* (see Fig. 6) of these clincher-plates are directly on the center line of the shafts S S, and the corners *s s* (see Fig. 6) are on the periphery-line of the shafts. The diameters of the shafts are of such dimensions that the corners *r r* shall be only a little wider apart than the width of the staples, so that as the legs of the staple project through the book and enter the slotted plate N they may also pass between the clincher-plates, bear against their inclined faces, and be slightly turned inward, as shown in Fig. 5.

To make a proper clinch of the staple-legs it is very important that the turning-point of the clinchers should be as close behind the staple-legs as possible, and at the same time close to the face of the book-pack, and, to make such clinchers, there is evidently no room to place pivots upon which to turn them at the center-points *r r*.

Therefore, to fully avail myself of this true form of clincher,
168 I employ the extended shafts S S, with cranks at their lower ends to partially rotate them, and with their upper ends so worked out as to accommodate themselves to the interfering slotted guide-plate N, and at the same time to have the points of contact with the staple-legs of the proper form, and in that close relation, as described, which shall make the most perfect clinch of the staple-legs.

To provide economical cutters for the wire, such as need seldom be sharpened, I employ circular steel disks 40 41, one of which, 41, has a beveled-edge hole through it (see Fig. 10), while the other, 40, is beveled around its outer edge.

It is obvious that when these disks are placed in supports, so that the one shall pass across the face of the other, any wire projecting through the hole in the one disk would be cut off by the beveled edge of the other, in passing across the face of it. These little disks are set in supports, so that they may be turned around at pleasure, to present a fresh cutting-edge, so that, until the entire circumference is dulled, they need not be removed. In practice such cutters last about two years before they need sharpening, and are therefore very economical.

Operation: The machine in a state of rest stands with its swinging bracket B in its highest position, the drills being in position to to perforate the book-pack, and the bending-fork in position to form a staple. It is set in motion by depressing the treadle X, which, rocking the shaft 20, draws back the locking-bar 29, so as to allow the locking-disk 30 to revolve, and the spring-seated pawl 34, carried by it, to engage with a ratchet-wheel, 32, which is fast on the hollow shaft 81, supporting the driving-wheel 5, thus coupling it with the main shaft A. This same movement through the rod R operates the toggle-lever D, and moves the guide-plate G forward, and closes the feed-rollers I and J upon the book-pack W, which is supposed to have been fed to the machine, as seen in Fig. 6.

At each revolution of the main shaft the following operations are effected: The roller 36, running in cam-groove 33, moves the lever V, thus actuating the mechanism for rotating the perforating-awls and reciprocating them forward, guided by the holes in the plate *n* through the book-pack, and retracts them. The bending-fork O is simultaneously moved forward, by the slot 37 of cam 48, a distance sufficient for it to engage the wire and bend it around the forming-mandrel *t*, thus forming it into a staple, the legs of which rest in the longitudinal grooves of the bending-fork O. The swinging bracket now descends by gravity, the cam Q releasing the supporting-lever 35, until it reaches the limit of this movement, and supports the forming-mandrel, as in Fig. 4, in the plane which was occupied by the drills, the bending-fork drawing the staple away from between the forming-mandrel *t* and the spring nipper *i*, and carrying the staple with it, as, descending and still moving forward, it abuts against and compresses the book-pack. The hammer 1, through its stock 38 and the cam 48, is then projected to force the staple-legs through the perforations in the book. The clinching mechanism is then operated by the tappet 27 on the wheel 24, to turn said legs down onto the book, while the hammer still rests upon the staple-head. The bending-fork and hammer are then withdrawn, during which movement the wheel 24, through the arm 25, rotates the wire-feed wheels 22, and protrudes a staple length of wire through the cutter-block C, and the eye *u* of the nipper *i*, and between it and the mandrel *t*, as in Fig. 3. The cam Q then depresses the lever 35, and carries the swinging arm B to its highest position, thus raising the bending-fork O and the perforating-awls into proper positions for a repetition of the operation. In this upward movement of the swinging arm, a plate, 50, which is carried near its front end, engages with the projection 51 on the forming mandrel and raises it slightly, which movement carries the piece of wire lying in the eye of the nipper *i* snugly against the faces 7 and 4 of the head-block 52, and forces the mandrel and nipper to slightly open and slide over the wire until it rests near the end of the mandrel and between it and the nipper, as in Fig. 11, in which position the wire is ready to be bent into a staple. The end of the swinging arm in its upward movement also strikes the lug P, and operates the cutters to sever the wire. The shaft A will thus have made one revolution, and brought the slot of the locking-disk 30 into a position to allow the locking-bar 29 to move outward, and the shaft 20 to be rocked back by the weight 49, thus opening the guides G Y, and rollers I I′ and J J′, and closing the roller H upon the book, as in Fig. 7, in which position of the parts the stapled book E will be delivered out of the machine, while a new book-pack, W, may be introduced and the operation repeated. The throw of the wire-feed wheels may be varied, and the position of the cutter-block C be adjusted, by the screw *h*, to make staples of different sizes.

A registering mechanism, M, of any approved construction, the driving-wheel of which is geared to the wire-feeding mechanism, may be applied to the machine, whereby the length of wire consumed may be accurately determined.

By increasing the dimensions of the feeding-rollers, and in some cases their number, so that their peripheries shall have a considerable surface length, the guide-plates may be dispensed with. In this arrangement the feeding-rollers will receive the book between them and form efficient guides.

The wire-guiding eye *u* might be formed in the face of the forming-mandrel, or partly in it and partly in the nipper *i*.

The following is claimed as new:

1. The combination, with staple-inserting mechanism and
169 a work-supporting table, of work-guides standing at right angles to said table, and forming a way in which the book-pack may rest upon its back or edge by gravity on said table to receive the staple, substantially as described.

2. The combination, with perforating mechanism and a work-supporting table, of work-guides standing at right angles to said table and forming a way in which the sheets or signatures of a book may rest by gravity on the table, so as to be perforated in lines parallel with its edges, substantially as described.

3. The combination, with mechanisms for inserting and clinching staples in the backs of books or similar articles, of reciprocating rotating drills, to perforate the paper or other material to receive the staples, substantially as described.

4. The combination, with staple-inserting and clinching mechanisms and work-supporting table, of two guides movable to fixed positions with relation to each other to adjust the width of the guide-way they form, substantially as described.

5. The combination, with book-stapling mechanism, of one or more pairs of compressing feeding-rollers, operating intermittingly to feed the book along a given space after the insertion of each staple, all substantially as described.

6. The combination, with book-stapling mechanism, of one or more pairs of feed-rollers operating continuously, to carry the work operated upon out of the way of the stapling mechanism after the stapling process has been completed, all substantially as described.

7. The combination, with stapling mechanisms, of one or more pairs of feed-rollers having intermittent rotary motion, and one or more pairs of feed-rollers having continuous rotary motion, constructed and operating substantially as described.

8. The combination, with staple-inserting mechanism, of a pair of clinchers, consisting of two rocking-shafts lying parallel to each other, and so shaped at their extremities as to clear the plate N and provide clinching-plates to engage with and bend the staple-legs toward each other, against the book or other article through which the staples have been driven, substantially as described.

9. The guide-plate N, provided with a slot having enlargements at its extremities, in combination with staple-inserting and clinching mechanisms, whereby the staple-legs as they are inserted are guided in the same planes to the clinchers, and in clinching are guided so as to be turned down in straight lines toward each other, substantially as described.

10. A staple-clinching mechanism consisting of two plates, *e*, operating by means substantially as described, so as to stand apart at proper angles to partially bend the staple-legs as they are forced through the work, and then to be swung toward the work upon centers which are slightly outside of the points of protrusion of the staple-legs through the work, whereby the clinching of said legs is effected by simple pressure, substantially as described.

11. A staple forming and presenting mechanism, consisting of a forming-mandrel and an internally-grooved bending-fork, the said mandrel being stationary during the operation of forming the staple around it, and the said bending-fork moving forward, by means substantially as described, to form and deposit the staple within its internal grooves, and downward to strip it from off the forming-mandrel, and forward to carry it into position to be inserted into the work, substantially as described.

12. The combination of the forming-mandrel and nipper, substantially as described.

13. The combination of a forming-mandrel and nipper constructed with a wire-guiding eye, substantially as described.

14. A forming-mandrel provided with a nipper and operated by means substantially as described, so as to be moved over the staple length of wire until said wire rests at a point near the extremity of the mandrel, where it is clamped by the nipper in position to be operated upon by the bending-fork, substantially as described.

15. The combination, with staple-clinching mechanism, of the swinging-bracket B, carrying the perforating mechanism and the staple forming and inserting mechanism, substantially as described.

16. The combination of slide 10, toggle D, and rock-shaft 20, substantially as described.

17. The combination of slide 10, toggle D, head 19, and screw T, substantially as described.

18. The combination of rollers H H′, bell-crank 18, and toggle-lever D, substantially as described.

19. The combination of bell-crank L, slider K, rack *b*, pinion *j*, wheel U, and drill-spindles, substantially as described.

20. The combination of a swinging bracket carrying drill-spindles and gears for rotating them, with a reciprocating rack for actuating the spindle-gears, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY R. HEYL.

Witnesses:
HENRY T. MUNSON.
M. B. PHILIPP.

(Here follows diagrams marked pp. 170, 171, 172, 173.)

4 Sheets—Sheet 1.

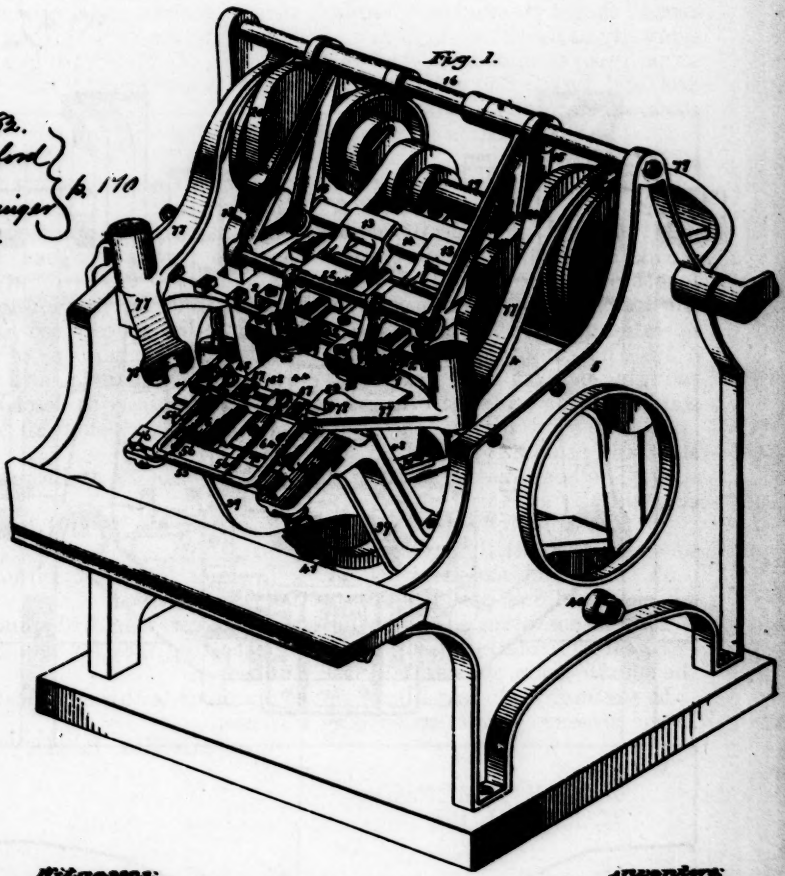
H. R. HEYL & H. BREHMER.

BOOK SEWING-MACHINES.

No. 191,426. Patented May 29, 1877.

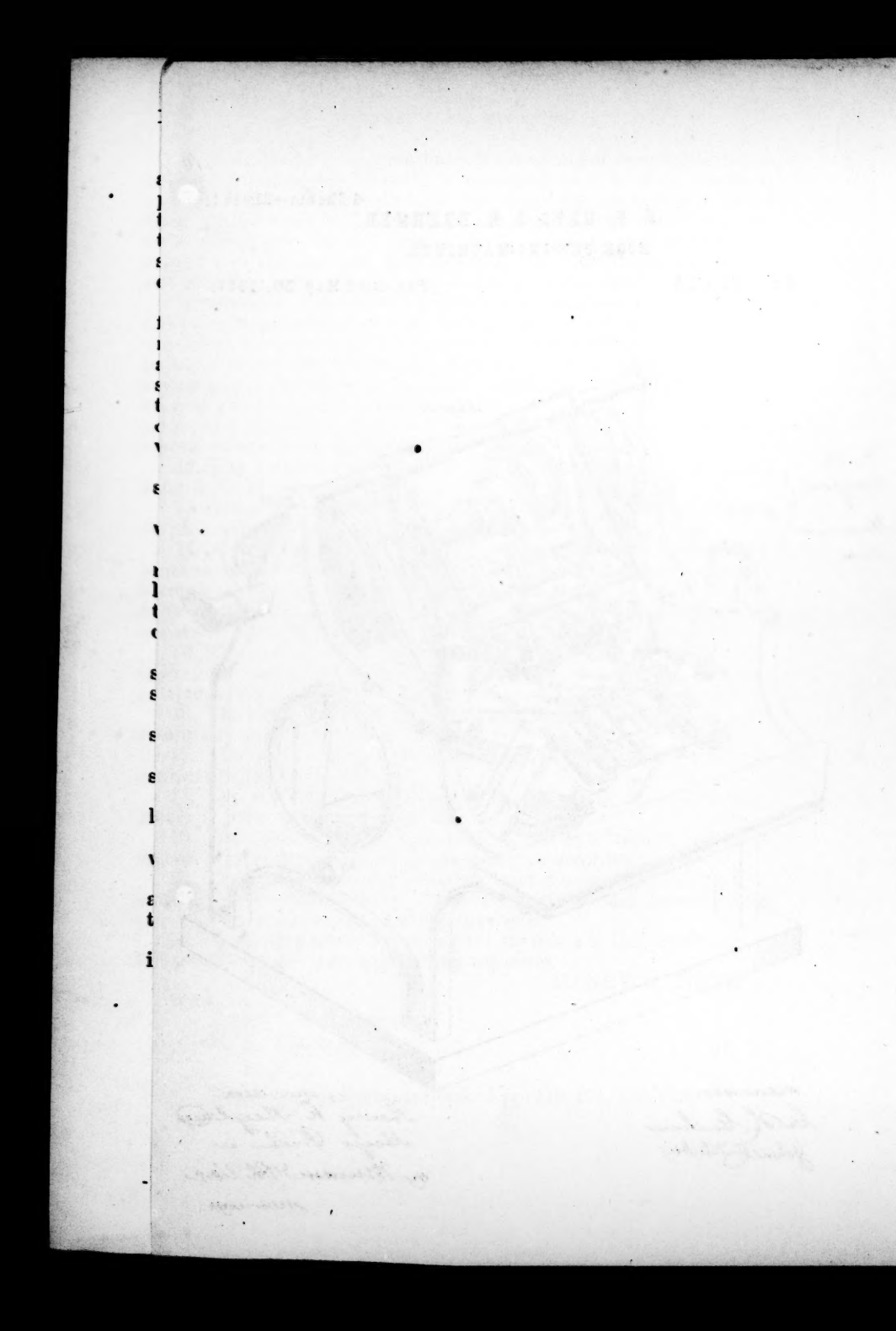
No. 82. Crawford & Mayesinger et al. p. 170

Fig. 1.



Witnesses:
Geo. H. Graham
John R. Huber

Inventors:
Henry R. Heyl
Hugo Brehmer
by Munn & Philipp
Attorneys.



4 Sheets—Sheet 2.

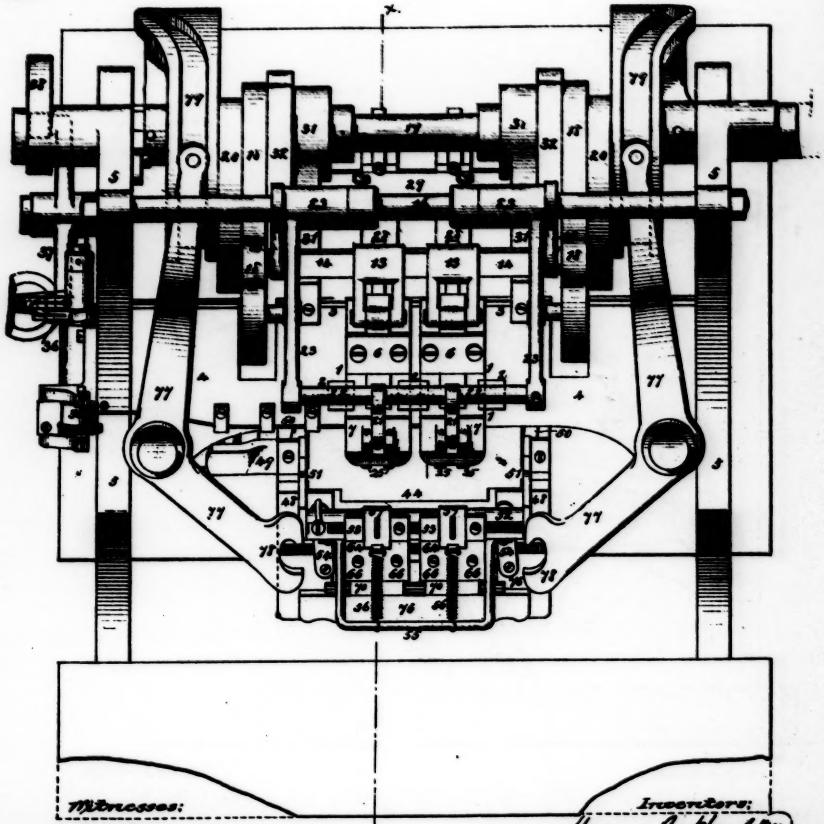
H. R. HEYL & H. BREHMER.

BOOK SEWING-MACHINES.

No. 191,426. Patented May 29, 1877.

No. 82, Crawford v. Heyninger et al. p. 171

Fig. 2.

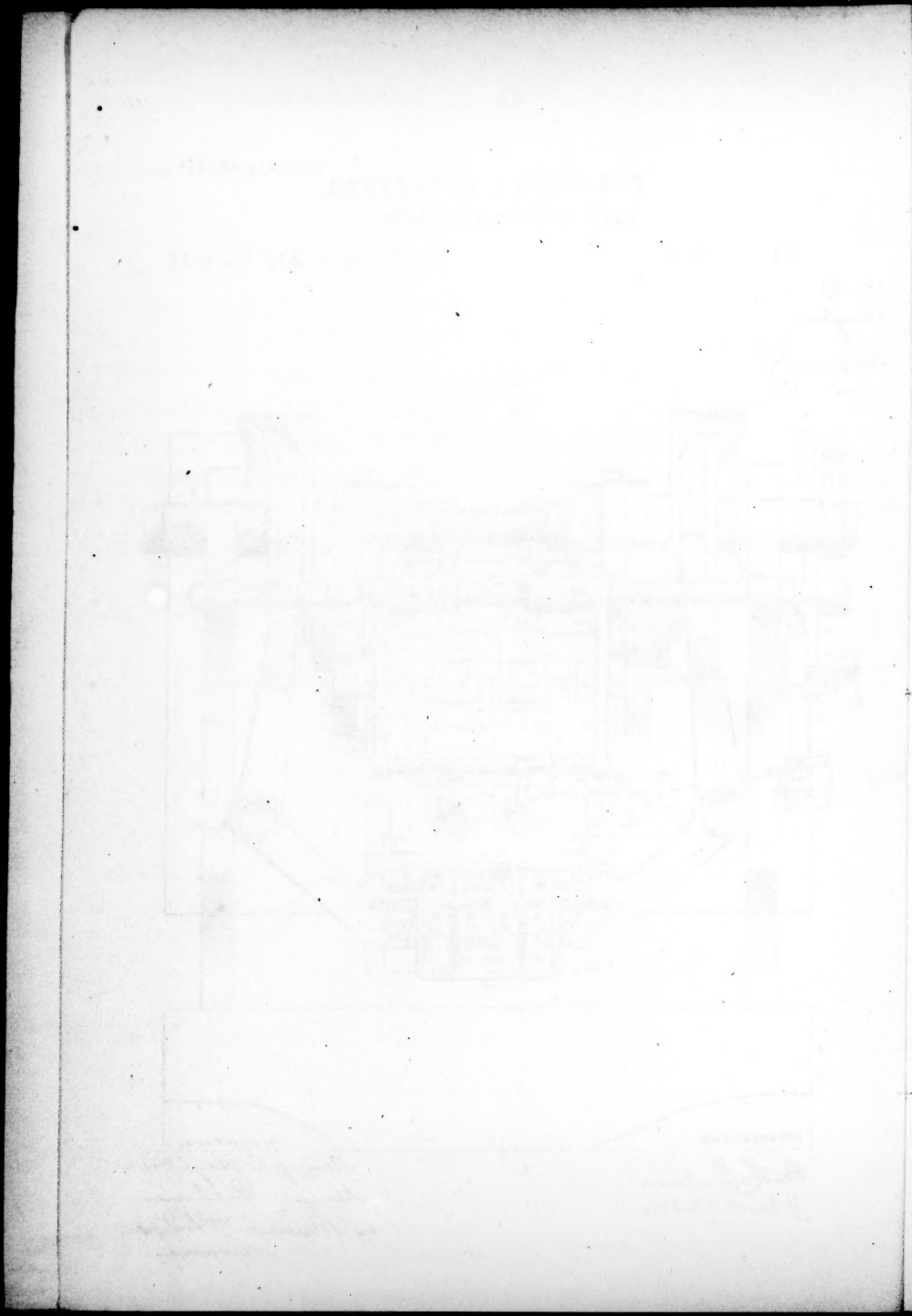


Witnesses:

Geo. H. Graham.
John L. Kleber

Inventors:

Henry R. Heyl and
Hugo Brehmer
by Munn & Philipp
Attorneys.



4 Sheets—Sheet 3.

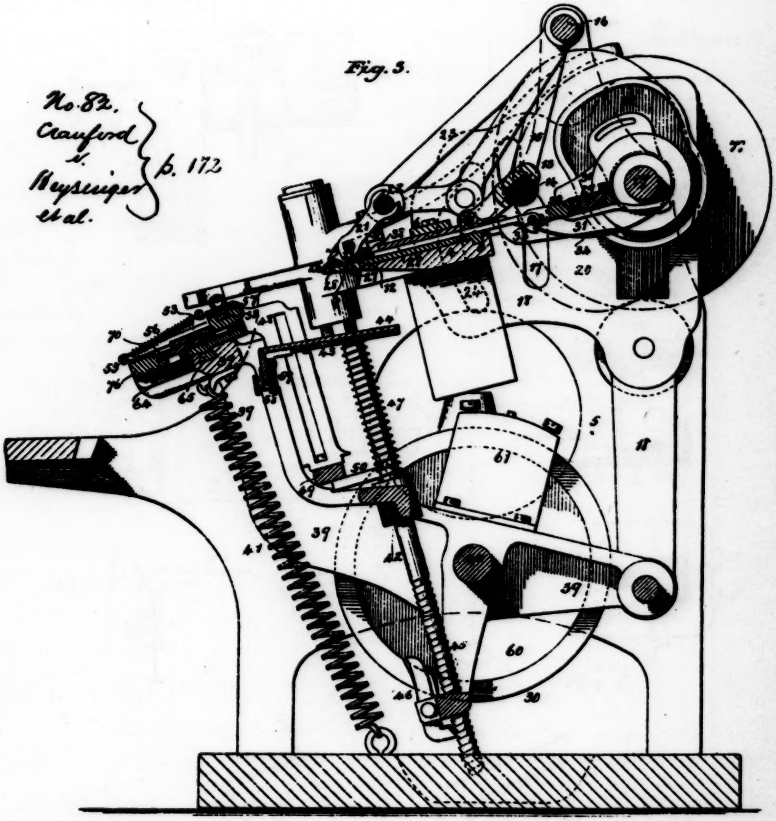
H. R. HEYL & H. BREHMER.

BOOK SEWING-MACHINES.

No. 191,426. Patented May 29, 1877.

Fig. 3.

No. 82. Crawford & Heyseiger et al. p. 172



Witnesses:

Geo. H. Graham.

John C. Kluber.

Inventors:

Henry R. Heyl and Hugo Brehmer

by Munson & Philipp

Attorneys.

4 Sheets—Sheet 4.

H. R. HEYL & H. BREHMER.

BOOK SEWING-MACHINES.

No. 191,426. Patented May 29, 1877.

Fig. 4.

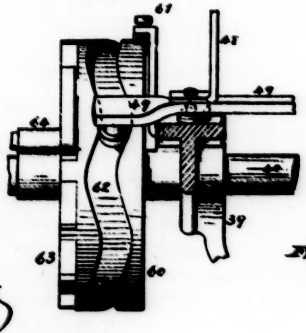
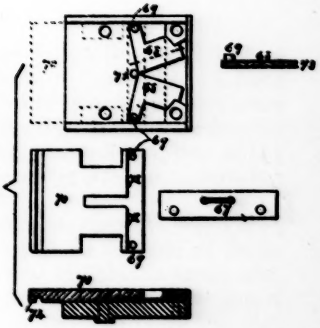


Fig. 5.



No. 82. Crawford & Kensinger et al. p. 173

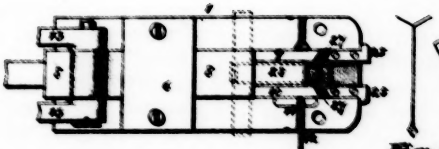


Fig. 6.

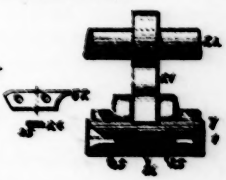
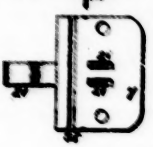


Fig. 7.



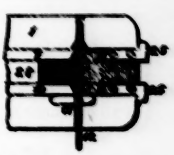
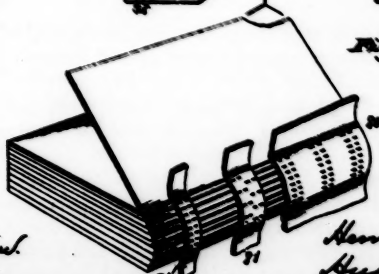


Fig. 8.



Witnesses:

Geo. H. Graham.

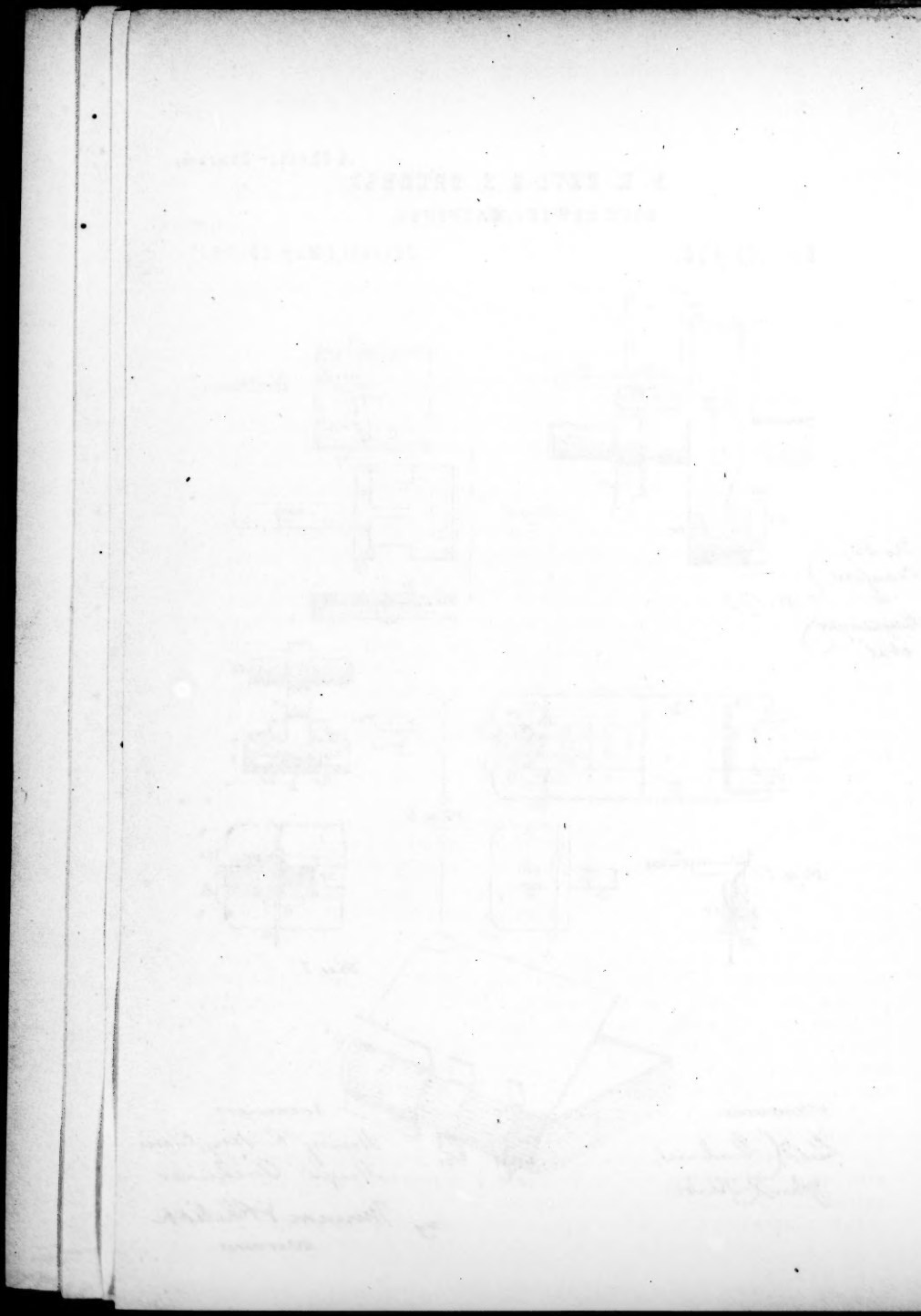
John L. Kluber.

Inventors:

Henry R. Heyl and Hugo Brehmer

By Munn & Philipp

Attorneys.



174 UNITED STATES PATENT OFFICE.

HENRY R. HEYL and HUGO BREHMER, of Philadelphia, Pennsylvania, assignors to the Novelty Paper Box Company, of same place.

Improvement in Book-Sewing Machines.

Specification forming part of Letters Patent No. 191,426, dated May 29, 1877; application filed January 11, 1877.

To all whom it may concern:

Be it known that we, Henry R. Heyl and Hugo Brehmer, both of the city and county of Philadelphia and State of Pennsylvania, have jointly invented certain new and useful improvements in machines for stitching and sewing books with wire staples; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of our invention is to produce a machine to insert wire staples, either singly or several simultaneously, in the fold of book-signatures while partially or wholly open, and clinch the same, and, when several signatures are to be united to form one book, to insert the staples, either singly or several simultaneously, through the fold of the signature when partially or wholly open, and also through tapes or bands at the back of the signature, so that when several of such signatures are successively secured to said tapes or bands they shall be bound together by a strong and flexible binding, such as is embodied in the United States letters patent granted to Henry R. Heyl, August 8, 1876, No. 180,765.

The invention consists in the devices and their combinations, hereinafter fully described and claimed.

In the drawings, figure 1 is a perspective view of a machine embodying our invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section through the line X X of Fig. 2. Figs. 4, 5, 6, and 7 are detail views of various important parts of the machine; and Fig. 8 is a view of a book illustrating some of the kinds of work done by this machine.

This machine, embodying our invention, differs from the prior machines embodied in United States letters patent granted to Henry R. Heyl and August Brehmer, October 8, 1872, No. 132,078, assigned to American Paper Box Machine Company, and those granted to Henry R. Heyl, assigned to the Novelty Paper Box Company, March, 28, 1876, No. 175,457, and October 24, 1876, No. 183,670, in the following general features:

It is adapted to insert staples, singly or several simultaneously, through the fold of a book-signature partially or wholly open from the inside, and to continue the operation on successive signatures without requiring that any of them shall be removed until the required number shall have been stapled.

It is adapted to hold one or more binding tapes or bands between

the back edges of the signature and the clinching mechanism, so that the staples may be clinched upon the tapes or bands, and thus secure the signatures firmly thereto.

The table upon which the signatures are supported is capable of being moved downward, at or nearly at right angles, to the plane of operation of the staple-inserting devices, so that as the signatures of the book are multiplied, each freshly-added signature will occupy the place of its predecessor during the stapling operation, and thus the signatures are gradually lowered until the last signature is stapled.

The completed book or number of signatures may then be removed and the table raised to the proper height to rightly hold the first of another series of signatures.

Staple forming and inserting: 1 is a head-block, secured by clamps 2 and matching 3 to the support 4 of the frame 5 of the machine, and capable of longitudinal adjustment.

This head-block is provided with a groove, partially covered by removable plates 6 7.

Within this groove is a bending-fork, 8, the prongs 9 10 of which are made beveling, as shown in the drawing at Fig. 6, to bend the wire from its ends around a swinging mandrel, and to enable one prong, 10, to operate, in connection with a die, 11, at the end of the wire-feeding channel 12 in the head-block, as a cutter to sever the wire.

These prongs 9 10 are provided with channels on their inner surfaces to receive the staple as it is formed.

This bending-fork is connected at its rear end to a bar, 14, by a link, 13, adjustable longitudinally on said bar.

The bar 14 is attached to two arms, 15, pivoted to a shaft, 16, secured to the frame 5 of the machine, and is vibrated by two similar cams, 17, on plates 18, that straddle the main shaft 19, and receive motion through cams 20 on said main shaft, that impart a perfectly uniform motion to it.

21 is a swinging mandrel, pivoted to the plate 7, its rear end being slotted, and fitting loosely over a shaft, 22, secured to arms 23, pivoted to the shaft 16.

These arms 23 are vibrated, to impart motion to the swinging mandrel 21, by two similar cams, 24, on plates 18, that impart a perfectly uniform motion to the shaft 22.

The front end of the mandrel 21 is bifurcated, and the bifurcations project through two slots in the plate 7.

The reason we prefer to use these slots and bifurcations is, that if the mandrel were in one piece and projected through one slot, when the wire is being fed it would have a tendency to enter the slot, and thus, possibly, cause trouble, while in this construction it is met by a plane surface, which obviates this difficulty.

25 are plates, preferably removably secured by the dowel-pins and holes to the head-block 1.

These are provided with channels 26 on their inner sides, which serve to guide the staple and present it for insertion.

Holes 27 are made through the bottom of the head-block 1, ex-

tending from the recess, to allow any small particles of wire, &c., to fall out, and thus prevent the space between the ends of the prongs 9 10 of the bending-fork and the plates 25 from being clogged.

28 is a staple driver, reciprocated within the bending-fork 8 by a bar, 29, to which it is connected through a slide, 30, adjustable to fixed positions thereon, said bar moving in bearings 31, and receiving a perfectly uniform motion through two similar cams, 32, on the main shaft 19.

The driver 28 is connected to the slide 30 by means of a pin, 33, fitting into elongated bearings in said slide, against the outer surface of which the pin is forced by means of a spring, 34, having its bearings in projections upon the slide and on the driver.

This construction provides against a too rigid pressure of the staple-driver on the crown of the staple, and allows it to accommodate itself to the varying thicknesses of the paper to be stapled, the spring 34 being made stiff enough to overcome the resistance of the staple as it pierces the paper, and yet not so stiff as to embed the staple-crown too deeply into the paper.

The front of the head-block 1, the plate 7, and support 4 are cut away at an angle, as shown, so as to enter the fold of the signature and come close to the paper while the staple is being driven, and the plates 25 may project slightly beyond the front of the head-block, to more effectually accomplish this result.

It will be seen that the bending-fork 8, with its prongs 9 10, does not move forward against the paper to be stapled, and act as a guide and support for the staple while it is being inserted, as is the case in the machines hereinbefore referred to as patented, but that a continuation of the staple-channels from the ends of the prongs 9 10 of the bending-fork to the point where the staple enters the paper is formed by means of the channels 26 of the plates 25.

We are thereby enabled to form our staples farther back and away from the point of insertion, and to materially shorten the reciprocating motion of the bending-fork, and to make the ends of the latter of the desirable form described.

These are important objects, especially in machines for inserting staples in the fold of signatures only partially opened.

It is desirable to have two or more head-blocks, 1, each provided with a bending-fork, 8, swinging mandrel 21, plates 25, with channels 26, staple-driver 28, and connections described, so as to simultaneously insert all the staples required for each signature, all being operated by bars 14 29, shaft 22, and cams 17 20 24 32, which are common to each set of devices.

Each head-block, with its set of staple forming and inserting devices and connections, is capable of adjustment to and from the other, as the size of the book may determine and by the means described.

In the drawings we have only shown two head-blocks to illustrate our invention; but any necessary number may be arranged side by side.

When several are employed, instead of using several wire-feeding rollers, one for each head-block, we prefer to use but one pair of

feed-rolls, 35, by which all the wires are fed simultaneously and uniformly.

These feed-rolls are intermittingly rotated by means of a pawl, 36, receiving motion through a weighted lever, 37, from a cam, 88, on the main shaft 19 of the machine, acting upon a ratchet-wheel secured to the shaft of one roller, which is geared to the other.

Each head-block is provided with an additional wire-channel, 38, which leads the wires to the next head-block, it forming a free passage over the bending-fork and hammer for several wires.

Signature and tape holding and presenting: 39 is a jacket, journaled on a shaft, 40, secured to the frame 5 of the machine, and vibrated by similar cams 20 through plates 18, straddling the main shaft 19, having rollers bearing upon the cams, and kept in contact with the latter by a spring, 41.

176 In this bracket a standard, 42, has bearings, supporting a plate, 43, upon which a table, 44, holding the signatures to be stapled, loosely rests.

The lower portion of this standard has a ratchet, 45, upon it, into which pawls 46, two or more in number, catch, preventing the plate and table from being raised by the pressure of a spring, 47, as it is lowered to give room for a fresh signature after the one to be operated upon has been stapled.

The table 44 is provided with lugs upon its under side, fitting into slots in the plate 43, which permit its longitudinal movement, and is guided by slotted standards 48, secured to a bar, 49, supported upon arms 50, pivoted to the bracket 39, projections 51 from each end of the table 44 fitting into the slots of said standards.

The standards 48 are connected at their top by a slotted bar, 52, to which a recessed cap, 53, is adjustably secured, said standards and bar being partially supported by arms 54, pivoted to the bracket 39.

Secured to the bar 52 is an open frame, 55, to which a spring, 56, with clasp 57, is adjustably connected, the latter serving to hold one end of the binding tape or band to the cap 53, forming an adjustable clamp for the same, which allows the binding tape or band to slip as the table 44 is lowered for each fresh signature.

To the under side of the table 44 is adjustably secured a clamp, 58, between which and a spring, 59, the other end of the binding tape or band is held.

As many clamps, consisting of the spring-clasp 56 57, cap 53, and clamps 58, are provided as there are head-blocks 1, unless the tape or band is very wide, when one will do, their function being to hold the binding tape or band neatly in front of the clinching devices, and between them and the back of the signatures.

The bar 49 is controlled by a cam, 60 (see Fig. 4), which runs loosely upon the shaft 40, to which the bracket 39 is journaled.

A friction-clamp, 61, secured to the bracket 39, and pressing upon the periphery of the cam 60, causes it to move with the bracket 39, if desired.

On the cam 60 is a zigzag groove, 62, in which a roller on the end of the bar 49 fits.

This cam is also provided with ratchet-teeth 63 upon its periph-

ery, into which a pawl, 64, pivoted to the frame of the machine, is made to engage, for the purpose and in the manner hereinafter described.

The degree of pressure of the spring 47 materially affects the compactness of the stapling, and as different kinds of paper require more or less swell in the back of the book the pressure of the spring must be varied to correspond thereto.

Instead of a spring a lever with removable or adjustable weights may be employed.

Clinching: 64 are clincher-stocks, secured adjustably, by clamps 65 and set-screws 66, to the bracket 39, corresponding in number and position to the head-blocks 1.

They are shown more clearly in detail views, Fig. 5.

Each is provided with devices for first bending toward each other the protruding legs of the staple and then pressing them flat against the material through which the staples have been inserted.

The clincher-stock is formed in front by a plate, provided with a slot, 67, countersunk at its ends, which plate acts as a support for the binding tapes or bands and signatures against the thrust of the staple, the legs of which, coming directly opposite the countersinks, are guided by them with certainty into the slot.

68 are clincher-plates, of bell-crank form, pivoted at 69 to a slide, 70.

A stud, 71, is fixed to the clincher-stock, around which the clincher-plates turn as a common center; yet these plates are not attached to this stud, but are only held against it during their partial rotation, until a shoulder, 72, upon the slide comes in contact with them, when they move together.

This shoulder 72 is not essential, as, when the clincher-plates come together and the slide moves forward, they would move with it.

In moving the slide 70 forward the clincher-plates 68 are first swung around the stud 71 until their forward ends meet, which serve to bend the legs of the staple around toward each other, and nearly flat against the material being stapled.

The continued forward motion of the slide 70 forces the clincher-plates forward bodily through the slot 67, and hard against the bent staple-legs, which operate to close them down firmly and flat against the binding tape or bands, or other material through which the staple has been inserted.

A slight groove, 73, is made in the outer ends of the clincher-plates 68, to prevent the legs of the staple from slipping off to one side while under pressure.

The slide 70 is provided with a tenon, 74, which fits in a mortise, 75, in a bar, 76, working in bearings on the bracket 39.

This bar is operated by two levers, 77, bifurcated at their outer ends at 78, operated by the cams 79, which levers, when the bracket 39 has been vibrated to present the signature to the head-blocks, engage with the ends of the bar 76, when the staple has been inserted, these cams then moving it forward to operate the clinching-plates 68, and, after the clinching has been completed, move the

clinching-plates 68 back, and then release the bar 76, the bracket 39 again assuming a position ready to receive another signature.

As many clincher-stocks may be arranged side by side, and their clincher-plates all be operated by the same bar 76, as there are head-blocks 1, which can be adjusted to and from each other.

177 If the table 44 remained stationary during the stapling operations the staples would all be inserted in a line, as shown in Fig. 8 at 80, and thus render that portion of the book bulky.

To obviate this it becomes necessary sometimes to set the staples in several rows in the same tape or band, as shown in Fig. 8 at 81.

To accomplish this the table 44 and tapes are shifted sidewise, between the stapling of each signature in the following ma nner, the tapes or bands being made wide enough to permit this:

The pawl 64 is thrown into contact with the rachet-teeth 63 of the cam 60.

As the bracket 39 is vibrated into position to permit the staple to be inserted, and as the cam 60 cannot move, being held by the pawl 64, the friction-clamp 61 slides over the periphery of the cam 60, and the bar 49 is moved by the zigzag groove 62, and with it the standards 48 and table 44.

As the bracket 39 is vibrated back into position to receive another signature the cam 60 is caused to move with it, through means of the friction-clamp 61, until the pawl 64 again engages with the ratchet-teeth 63 on cam 60, and the groove 62 in the cam having changed its direction, upon the next movement of the bracket 39 the table is forced back again into its original position.

Thus, upon the addition of each new signature the table is shifted sidewise.

By increasing this sidewise motion one head-block, 1, and one clincher-stock could be employed to insert several staples automatically through one signature; but we prefer to duplicate the head-blocks and clincher-stocks, that method being most economical in the results obtained.

In machines constructed as above described the staples are driven through the signature and binding tapes or bands without any previous perforations for their legs, the latter making their own holes.

If at any time it should be found desirable, by reason of the hardness of the material to be stapled, or for any other cause, that holes be made for the reception of the legs of the staple, we provide the plates 25 with short points 82, which also have the channels 26 on their inner sides, as shown in Fig. 6.

Then, by altering the faces of the cams 20, so that just before the clinchers operate to bend down the legs of the staple they are slightly withdrawn, the staple-driver 28, resting upon the crown of the staple, pushes the signature partially off of said points, sufficiently out of the way to protect them from injury by the clinchers.

Mode of operation: The table 44 is placed in its highest position, and that portion of the bracket 39 carrying the table 44 and clincher-stocks 64 is vibrated to its lowest position.

A signature is then laid upon the table 44, partially opened, in which position it is held by the hand of the operator.

As the main shaft 19 revolves the cams 20 raise the bracket 39, the cams 24 vibrate the swinging mandrel 21, causing its bifurcations to pass through the slots in plate 7, and in front of the wire previously fed. The cams 17 then cause the bending-fork 8 and its prongs 9 10 to advance to sever the wire, and bend it from its ends toward the center, around the bifurcations of the mandrel 21, until the ends of the prongs 9 10 of said fork come in proximity to the ends of the plates 25, when the cams 24 cause the mandrel 21 to be vibrated, and its bifurcations to be removed from the recess in the head-block 1, out of the path of the staple-driver 28, which is then caused to advance by cams 32 forcing the staple which has just been formed from the channels in the inner faces of the prongs 9 10 of the bending-fork 8 into the channels 26 in the plates 25.

While this operation is going on the bracket 39 has been raised so that the front of the head-block lies snugly in the fold of the signature, pressing the latter and the binding tapes or bands against the front plate of the clincher-stock, having the slot 67.

The staple-driver 28 has at this moment forced the staple, guided by the channels 26 of the plates 25, into and through the signature and binding tape or band, forcing its crown snugly against the fold of the signature, and its legs guided by the countersinks into the slot 67.

The driver 28 in this position rests stationary, while the cams 79, through the levers 77 and bar 76, force forward the slide 70, which causes the clinching-plates 68 to partially revolve around the stud 71 until they meet, thus bending the legs of the staple toward each other, at which time the slide 70, with the said plates, still advancing, forces the bent ends of the staple legs out of the slot 67, and snugly against the binding tape or band and signature.

The cams 32 and connections then cause the driver 28 to be retracted; the cams 17 and their connections then cause the bending-fork 8 and prongs 9 10 to be retracted; the cams 20 and connections then cause the bracket 39 to be lowered; the operator allows the signature to be closed, when the machine is ready to receive another signature, which is operated upon as before.

As the bracket 39 is raised for the next operation the operator, holding the new signature open as before, the lower half coming in contact with the under surface of the head-block 1 and support 4, causes the table 44 to yield just the thickness of a signature, the pawls 46 and ratchet 45 preventing it from rising.

When it is found desirable to place the staples in the sig-
178 natures and binding tapes or bands in alternate rows, as shown at 81, Fig. 8, the pawl 64 is thrown into operation with the ratchet-teeth 63, and the table 44 is caused to be moved sidewise, backward, and forward in the manner before described.

We do not confine ourselves to the exact construction or arrangement of the devices described, as many others might be adopted that would perform the same function without departing from our invention.

What we claim as new, and desire to secure by letters patent, is—

1. Staple presenting and inserting devices, constructed substan-

tially as specified, so as to enter the fold of a partially opened signature, and present the staple within the same for insertion through the fold.

2. The combination of staple presenting and inserting devices, constructed so as to enter the fold of a partially-opened signature, and present the staple within the same for insertion through the fold, with a work-supporting table, which places the signature in position for the presentation and insertion of the staple, all substantially as specified.

3. The combination of staple presenting and inserting devices, constructed so as to enter the fold of a partially-opened signature, and present the staple within the same for insertion through the fold, with a work-supporting table, which places the signature in position for the presentation and insertion of the staple and clinching devices, all substantially as specified.

4. A support for staple inserting devices, cut away so as to present the staple within the fold of a partially-opened signature, for insertion through the same, substantially as described.

5. In combination with a bending-fork, grooved plates to receive the staple from the prongs of the fork, and guide and support it while being driven, all substantially as described.

6. In combination with a bending fork to form the staple, grooved plates to receive the staple from said fork, and guide and support it while being driven, and a staple-driver, all substantially as described.

7. The grooved plates for receiving the staple, and guiding and supporting it while being driven, provided with points to puncture the material, substantially as shown and described.

8. The combination of the staple-driver with the grooved plates, provided with points to puncture the material for the reception of the staple, substantially as described.

9. The clinchers having two motions, first rotating on a common center, to bend the staple-legs toward each other, and then moving forward in straight line to press the bent staple-legs close down upon the material through which they protrude, substantially as specified.

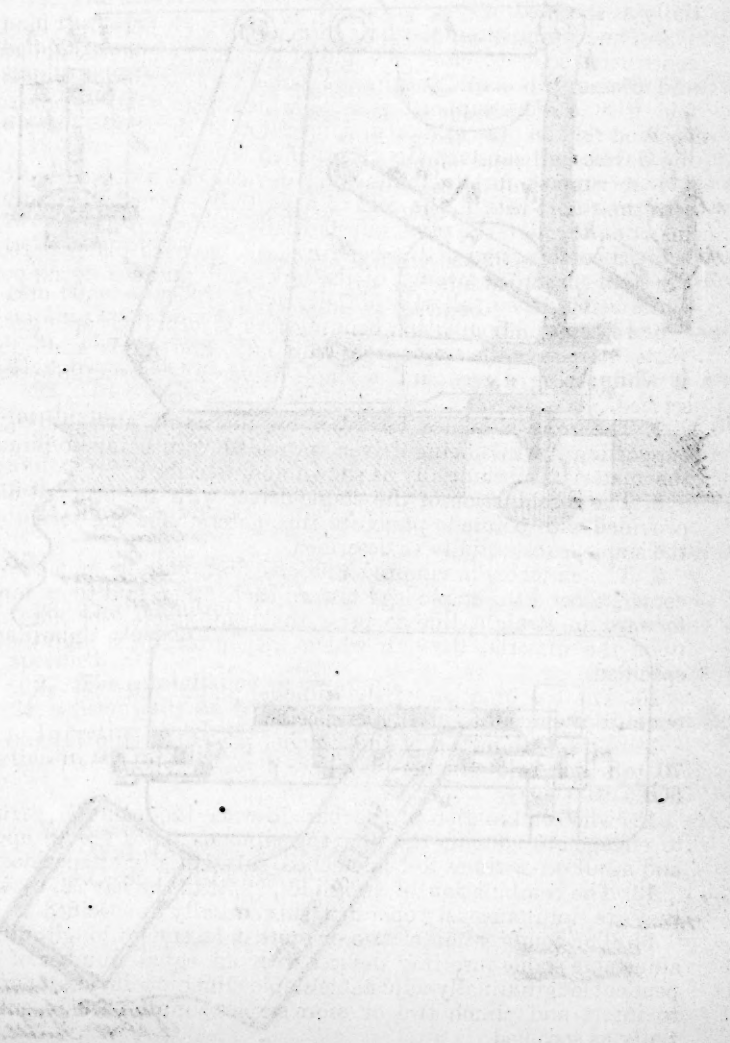
10. The combination of the clincher-plates with the slide that operates them, substantially as specified.

11. The combination of the clincher-plates 68, stud 71, and slide 70, to which said clincher-plates are pivoted, substantially as specified.

12. The combination of the bar 76 with the levers 77, arranged to engage only during the time the clincher-plates are to operate, and at all other times to be detached, substantially as specified.

13. The combination of two slides, 70, with the bar 76, by which they are simultaneously operated, substantially as specified.

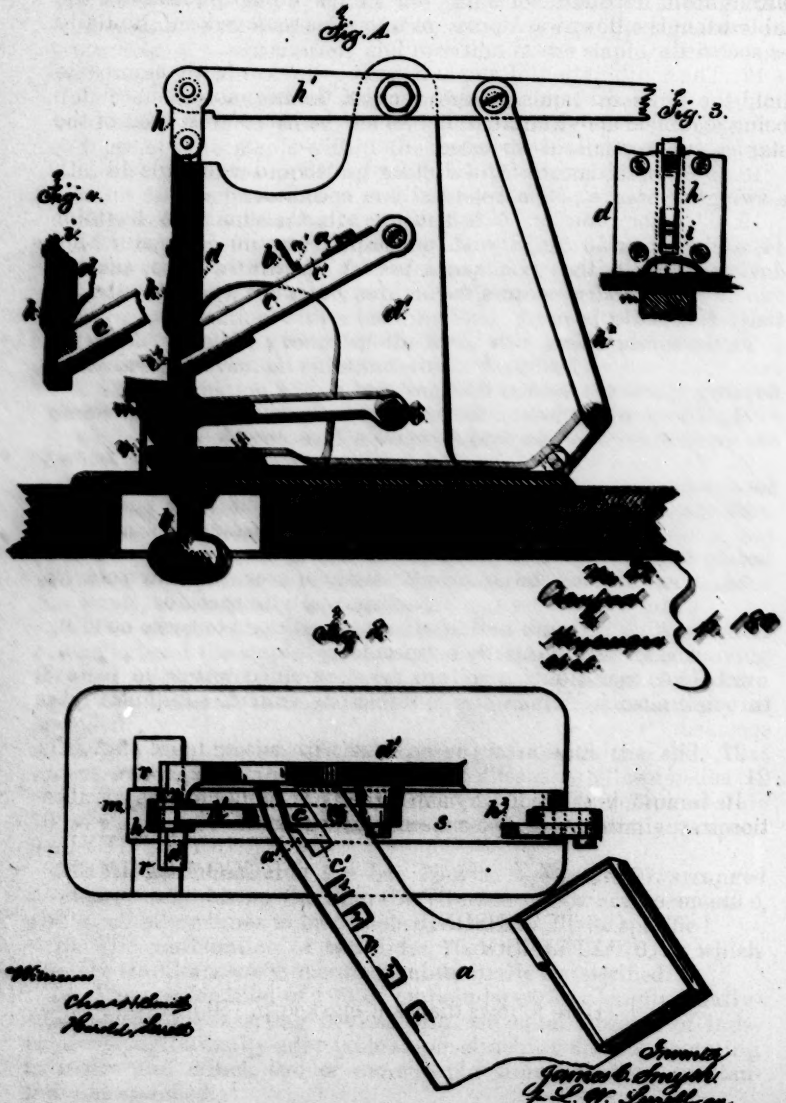
14. The combination of two or more independent longitudinally-adjustable staple-inserting devices with an equal number of independent longitudinally-adjustable staple-clinching devices, operating to insert and clinch two or more staples simultaneously, substantially as specified.



J. C. SMYTH. 180

MACHINE FOR STITCHING BOOKS WITH STAPLES.

No. 187,189. Patented Feb. 6, 1877.



15. The combination of staple inserting and clinching devices with a work-supporting table, constructed so as to retain the stapled signature thereon while the next signature is being stapled, all substantially as specified.

16. The combination of staple inserting and clinching devices with a table, 44, and devices to prevent the premature ascent of the table when the downward pressure upon it is removed, substantially as specified.

17. The combination of staple-inserting devices with clamps to hold the tapes or bands at the back of the signature, one clamp being arranged above and another below the line of insertion of the staples, substantially as specified.

18. The combination of the shifting-bar 49 and standards 48 with a swinging bracket, 39, substantially as specified.

19. The combination of a shifting-bar, 49, standards 48, table 44, and clamps 53 57 58 with the staple inserting and clinching devices, whereby the book and tapes are shifted sidewise, causing two or more rows of staples to be inserted into each tape, substantially as specified.

20. In combination with the shifting-bar 49 and standards 48, the cam 60, to automatically shift the bar and standards between each stapling operation, substantially as specified.

21. The combination of the cam 60 with the pawl 64 and clamp 61, constructed and operated substantially as specified.

22. The head-blocks 4, provided with two wire channels, as and for the purpose specified.

23. The combination, with a staple-driver, 28, of a spring, 34, and a slide, 30, having elongated bearings, substantially as specified.

24. The combination of bar 29 with one or more drivers, 28, slides 30, and springs 34, substantially as specified.

179 25. The combination of bar 14 with one or more bending-forks, 8, substantially as specified.

26. The mandrel 21, bifurcated, combined with the plate 7, through slots in which the bifurcations extend, substantially as specified.

27. The combination of the shaft 22 with one or more mandrels, 21, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY R. HEYL.
HUGO BREHMER.

Witnesses:
WM. C. STEVENSON.
C. S. PATTERSON.

(Here follows diagram marked p. 180.)

181 UNITED STATES PATENT OFFICE.

JAMES C. SMYTH, of Lynn, assignor to George L. Ward, of Boston, and Orianna S. Smyth, of Lynn, Massachusetts.

Improvement in Machines for Stitching Books with Staples.

Specification forming part of Letters Patent No. 187,189, dated February 6, 1877; application filed December 4, 1876.

To all whom it may concern:

Be it known that I, James C. Smyth, of Lynn, in the State of Massachusetts, have invented an improvement in machines for stitching books with staples, of which the following is a specification:

In letters patent No. 41180 granted January 5, 1864, to D. M. Smyth, a machine is described for sticking staples into blinds.

The present invention is an improvement upon the same, and relates to a means whereby the sticking mechanism is adapted to forcing the staple into and through a pamphlet or book, and clinching the same to hold the leaves together.

In the drawing, figure 1 is a vertical section of the staple-machine. Fig. 2 is a plan of the same, and Fig. 3 is an elevation partially in section.

The staples are supplied by a shaking hopper, or otherwise, upon the inclined plate *a*, and slide down the same against the inclined fence *b*, and along the same toward the staple-bar *c*. There is an opening at *c'* in the plate *a*, leaving a narrow strip, *a'*, of the plate *a*, which is of such a width relatively to the staple that, if a staple presents itself in the position of the staple 1, it slides along this strip *a'* and falls over the bar *c*, and hangs thereon with the points downward; but if a staple slides along down the gutter with the points against *b*, as at 2, the bar portion of the staple overbalances the same, causing the staple to fall over the edge of *a'*, through the opening *c'*, into a receptacle; and if a staple approaches and passes upon the strip *a'*, in the position shown at 3 or 4, the points are not supported, and it falls through the opening *c'*. By this construction, only those staples that are in a proper position to fall upon the inclined bar *c* are used, and the others are to be returned and scattered upon the plate *a* by hand or otherwise.

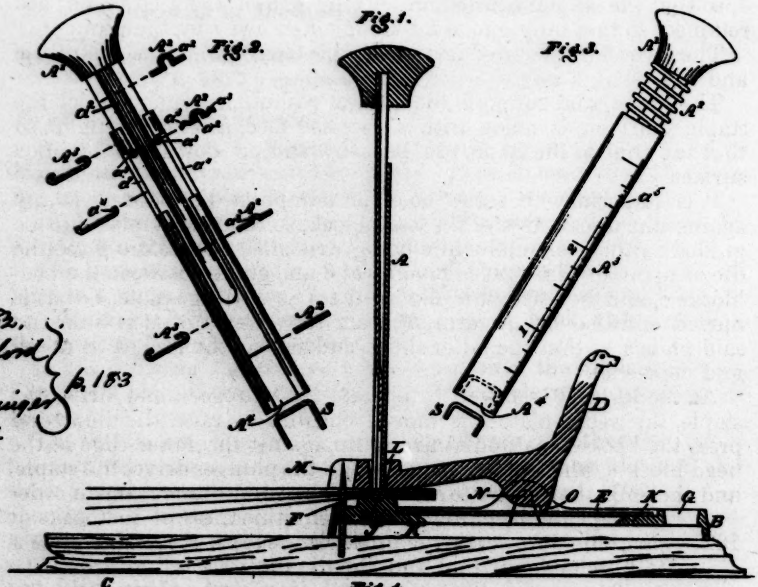
The operator preferably supplies the staples by hand, from time to time, upon the plate *a*, so that there will be a sufficient number upon the staple-bar *c* for use in the machine.

The staple-bar *c* is supported in an inclined position by the standard *d'* and head-block *d*, and in this head-block *d* is a channel of a corresponding sectional size to the staple, so that the staple can be moved vertically therein; and in this channel there is a plunger, *i*, connected by the link *h* to the lever h^1, so that it can be moved up and down, and upon each downward movement said plunger *i* presses upon the staple that is at the lowest end of the staple-bar *c*, and presses back the spring *k* and carries the staple down the channel in the head-block, and drives it through the pamphlet or book

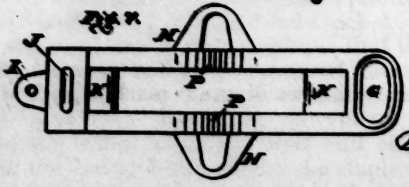
I. W. HEYSINGER. 183

Device for Filing and Binding Papers.

No. 226,402. Patented April 13, 1880.



No. 82, Crawford v. Heysinger et al. p. 183



Witnesses:

Inventor:

Isaac W. Heysinger

that is presented at the bottom of the head-block, as hereafter described.

It is to be understood that, as the plunger *i* is drawn up above the staple-bar *c*, the spring *k* returns to its position against the end of the staple-bar and supports the lowest of the staples, as seen in Fig. 4, so that the staples cannot run off the end of the incline, but are retained, so that only one at a time is taken away by the plunger.

The lever h^1 is operated in any suitable manner. I prefer a treadle and rod.

The die *m*, that supports the book or pamphlet through which the staple is driven, is made with a recessed face, as seen in Fig. 3, so that the ends of the staple are bent by sliding down the inclined surface.

It is important that the book or pamphlet be pressed firmly against the under edge of the head-block, so that the staples will be guided in their channel while being driven. I therefore place the die *m* upon an arm that is pivoted at 6 and guided between the bed-blocks *r*, and beneath this die *m* there is a wedge-plate, *s*, that is moved endwise by an arm, h^2, from the lever h^1 that is linked to said plate *s*, so that the latter slides endwise as the lever h^1 is raised and depressed.

As the lever h^1 is moved to operate the plunger *i* and drive the staple, the wedge-plate *s* is moved endwise to raise the die *m* and press the book or pamphlet firmly up against the lower edge of the head-block *d*, and hold the same while the plunger drives the staple, and the ends thereof are turned up against said die *m*; and in order to adapt the machine to different thickness of the books or
182 pamphlet, the screw *t* is provided, beneath the wedge-plate *s*, to raise or lower that and the die *m*.

As the plunger rises the wedge-plate *s* is moved endwise, bringing the thinner part of said plate beneath the said die *m*, so that the latter may descend and relieve the pressure upon the book and allow of its removal and the insertion of another book in its place.

I claim as my invention—

1. The inclined plate *a*, provided with the fence *b*, opening *c'*, and strip *a'*, in combination with the staple-bar *c*, substantially as and for the purposes set forth.

2. The combination of the sliding wedge-plate *s* and screw *t*, with the die *m* and staple-driving mechanism, substantially as set forth.

Signed by me this 31st day of August, A. D. 1876.

J. C. SMYTH.

Witnesses:
D. M. SMYTH.
F. J. BAXTER.

(Here follows diagram marked p. 183.)

184 UNITED STATES PATENT OFFICE.

ISAAC W. HEYSINGER, of Philadelphia, Pennsylvania.

Device for Filing and Binding Papers.

Specification forming part of Letters Patent No. 226,402, dated April 13, 1880. Application filed January 29, 1880.

To all whom it may concern:

Be it known that I, Isaac W. Heysinger, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented a certain improvement in devices for filing and binding papers, letters, &c., of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

Referring to the drawings, the lettering of which in all the figures is uniform, Figure 1 is a vertical longitudinal section of the whole device mounted upon a board. Fig. 2 is a front view of the staple-driver part proper. Fig. 3 is a rear view of the same; Fig. 4, a perspective view of the spring of the clip part; Fig. 5, a like view of the base of the clip; Fig. 6, the vibrating clamping and guide arm of the same; Fig. 7, a plan of the base of the clip from above.

The object of my invention is to produce a letter or paper filing device which shall hold a pile of loose sheets in position, the same gradually accumulating and being placed in position from time to time, as in an ordinary paper or letter clip; then, when a sufficient number are in place, to allow the whole to be firmly and permanently bound together without removing the same or using cords or other devices previously placed beneath the papers, the bound sheets then being removed and laid away and the apparatus being ready for a new supply.

The device consists of two portions—one the clip or base part, which, as shown in Fig. 1, may be attached, if desired, singly or in pairs, to a base-board, the other the staple-driver, the nose of which, being inserted into a slot prepared for the purpose, admits of the driving of a staple through the mass of papers and bending up the ends thereof upon a prepared block beneath, thus, as above said, firmly binding the whole together.

The base part is shown in section in Fig. 1, and the different parts composing the same may be seen in Figs. 4, 5, 6, and 7. It consists of a metallic base, Fig. 5, so cast or formed as to admit of the reception of the clamping-arm, Fig. 6, from beneath, the pins N N upon opposite sides of said clamping-bar thus engaging in the sockets P P, Figs. 1 and 5, which act as journal-boxes, said clamping-bar being held up to its place by the flat spring E, Figs. 1 and 4, which is afterward slipped into its seat in the manner shown in Fig. 1, the ends being supported by the shoulders K K, Figs. 1, 5, and 7, the center being free to sink beneath the heel O, Figs. 1 and 6, as the thumb-lever D is depressed. Of course a more expensive drilled mounting

may be used; but this form perfectly answers the purpose, and is very economical to manufacture, as the simple castings, if well made, go together without the touch of a file or other tool.

The spring E, Figs. 1 and 4, is clipped from a sheet of light-tempered steel, and is a simple flat bar, the cost of which, beyond the price of the steel, is inconsiderable. The clamping-arm, Fig. 6, is also cast in the simplest and cheapest manner. It consists of a thumb-piece, D, clamp L, and heel O, the whole supported when in position by the pins N N.

At its forward end, L, the clamp-bar is slotted, as shown in Figs. 1 and 6. This slot is for the reception of the nose of the driver A, Figs. 1, 2, and 3, and is of such form as readily to admit the same without much lateral play, and yet not retain the same rigidly, but to allow ready insertion or removal of the said driver. I prefer making it somewhat funnel-shaped toward the top for this purpose. In front of this slot is the bifurcation M (which may be a slot or hole). The object of this is to embrace the sides of the pin F, Fig. 1, and force the papers which may be placed in the clamping-jaws down upon the same, so that they may be held from slipping while others are placed upon them, until a sufficient quantity may have accumulated for binding. This pin may be attached to the base at I (see Figs. 5 and 7), or may, as in Fig. 1, be set into the base-board and pass up through the hole I, reserved for the same. It may also, for special purposes, be dispensed with sometimes.

Beneath the slot L when in place, Fig. 1, is a raised part of the base J, Figs. 1, 5, and 7, forming a block, upon which the slotted portion L of the clamping-arm rests, and which, together with it, forms the jaws whereby the papers are firmly held together. In this elevated portion J is a depression, which I prefer to form in the casting by the use of what is technically known as a "chill," whereby an excessively hard surface is secured at this particular point without additional expense and without weakening the body of the casting, the part being raised above the general surface for this purpose. I also sometimes cut this depression by a milling-wheel, or by other means well known to mechanics, some accuracy being requisite to cause the tool to work properly when put together.

The ears H H, Figs. 1, 5, and 7, are designed to give the base steadiness, and also to form lugs for attaching the same to the base-board C. I usually employ two of these clips upon one base-board, attaching them about four inches apart, Fig. 1, the board extending sufficiently far beyond to form a support for the letters or papers, a hole being made in the upper portion of the board between the two clips, for suspending the same when so desired.

The clamping-arms, Fig. 6, are so constructed that when the thumb-lever is depressed the heel O will pass sufficiently far beneath the bearing N to hold the slotted portion L raised from the base J until the end M is pressed upon, when it will close with a snap and drive the papers down upon the pin F, Fig. 1. In using two of these clips they are set open, and stand thus until the paper is laid in place, when they are successively closed; or the thumb-pieces D D

may be connected by a cross-bar, so that both are actuated simultaneously.

The opening G, Figs. 1, 5, and 7, is for suspending the clip when using it singly without the base-board C. The staple-driver A, Figs. 1, 2, and 3, is likewise formed as economically as possible to give accurate work, and is made with perfect accuracy of fit in the following manner: A properly-shaped blank is struck out of hard sheet metal in a die, the edges of the same being then formed up, as shown in Fig. 2 at A^3 A^3. This leaves an open groove, a^4 a^4, down the front, Fig. 2, and an enlargement in the upper middle portion of the said groove for the reception of the stop-motion of the sliding-bar a^3 a^3. In this grooved case fits accurately the longitudinally-moving bar A^2, which should be of tempered steel. This also is struck from the sheet, and corrugated or provided with a longitudinal stiffening-rib, as shown in Fig. 2 at A^2 A^2 A^2, with a gradually-decreasing depth of corrugation until at its lower part it becomes a flat bar, as at A^{2*}. This corrugated portion plays in the open groove of the outer case, and gives the greatest stiffness with the least weight of metal and cost of manufacture.

At a^3 a^3 are seen two raised points or stops upon the sliding bar A^2, which engage against the top of the enlarged portion of the groove of the outer face, Fig. 2, and arrest the motion of the sliding bar, so as to prevent its escape from the said case A^3. This open groove also allows the operator to see at a glance what length of staple, if any, may be contained in the staple-channel, the transverse portion of the staple extending across the same.

As different lengths of staples are used to correspond with various thicknesses of material to be bound, it is important to use staples of suitable lengths to clinch properly.

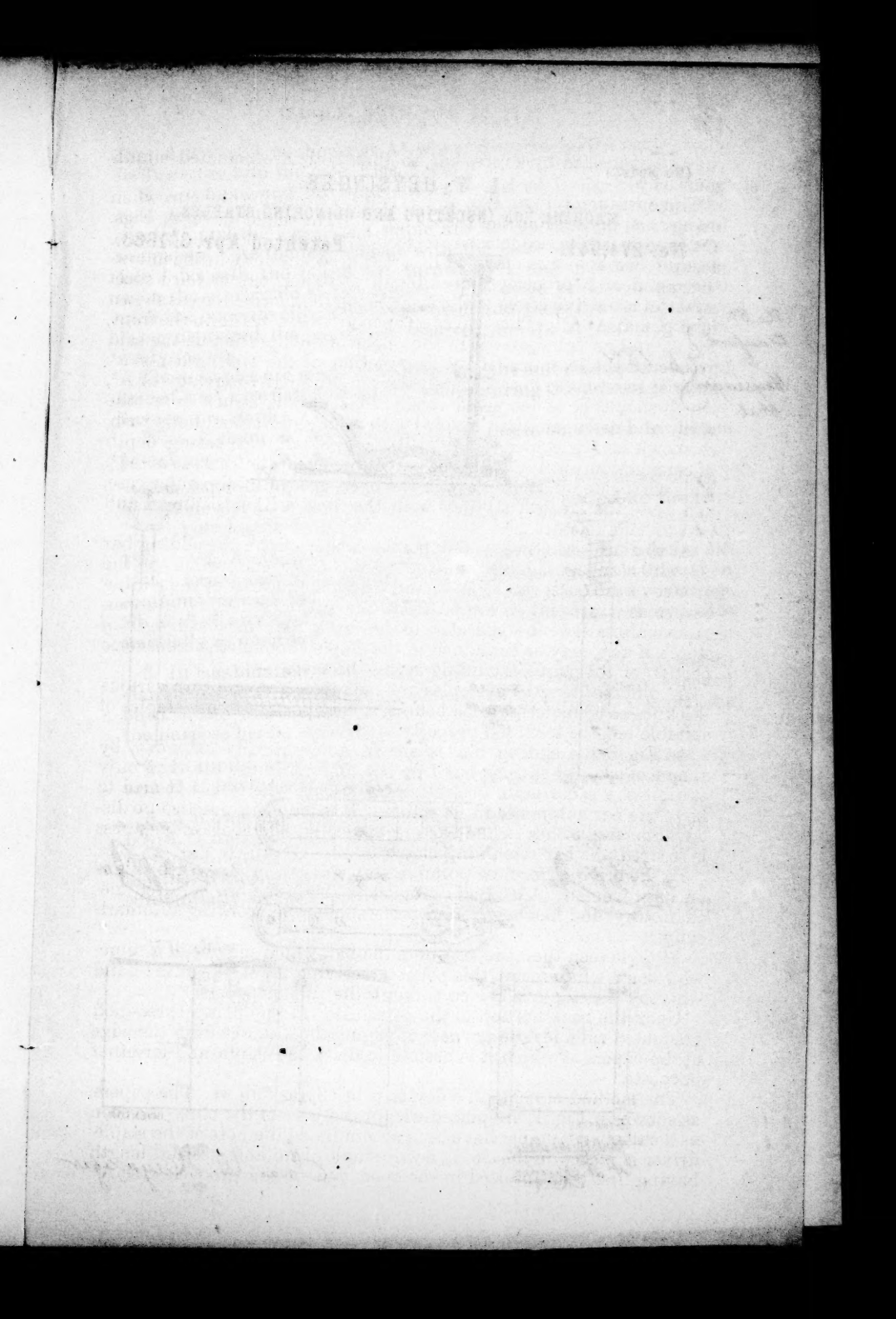
At Fig. 3 the sliding bar is shown automatically extended by means of a coiled spring; but I do not commonly use this, and only exhibit the same as a possible modification where it is desired to have the bar automatic in its action. It is found in practice no disadvantage to withdraw the bar mechanically, and that compactness is secured, the bar remaining closed up.

In the original form of portable staple-driver, upon which this is an improvement (A. C. Betts, August 7, 1866), the bar is raised mechanically, and has been found preferable to one working automatically.

At A′ is seen the head, cast onto the bar, which may be of a somewhat hard white metal, this portion receiving the stroke of the hand whereby the staple is driven through the pile of papers.

Upon the back portion of the outer case, a^5, Fig. 3, is a three-inch graduated rule, for the purpose of gaging the distance from the edge of the papers at which it is desired to drive the staple, and for other purposes.

The method of using this device is briefly as follows: The papers, as shown in Fig. 1, are placed within the jaws of the clip. As soon as a sufficient number have been accumulated the nose of the staple-driver is placed in the slot L, a wire staple of suitable size and length having first been inserted in the open end of the grooved case A^3,



(No Model.)

I. W. HEYSINGER.

187

MACHINE FOR INSERTING AND CLINCHING STAPLES.

No. 274,941. Patented Apr. 3, 1883.

No. 82. Crawford v. Heysinger Bal. b. 187.

Fig. 1.

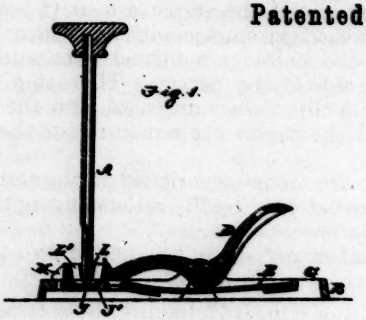


Fig. 2.

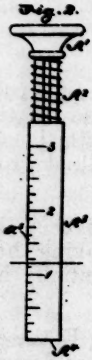


Fig. 2a.

Fig. 3.

Fig. 4.

Fig. 5.

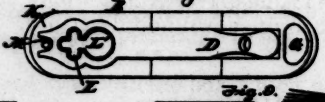


Fig. 6.

Fig. 7.

Fig. 8.

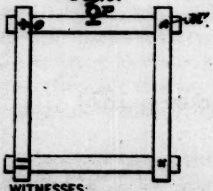
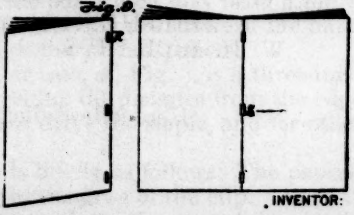


Fig. 9.



WITNESSES:

John A. Quackenbush

W. St. C. Kinahan

INVENTOR:

Isaac W. Heysinger

Figs. 1, 2, and 3, as shown at A^4, where S represents the staple ready for insertion into the case, Figs. 2 and 3.

When the nose of the staple-driver is placed in the slot L, being held perpendicularly, a blow is struck with the open hand upon the head A′, and the legs of the staple are driven through the mass of the papers. As the legs engage with the sides of the recessed surface J beneath, the points are turned over and clinched together upon the under side of the papers. The same process is repeated with the opposite clip, if two are used, and then, the thumb-levers being depressed, the papers are removed, and the apparatus is again ready for use.

These staples are made in various lengths and sizes, commonly of tinned steel wire flattened by the rollers during the process of manufacture into staples.

What I claim as my invention, and desire to secure by letters patent, is—

1. A paper-filing clip, B D, having the recessed clinching-block J and guide-slot L, or its equivalent, substantially as and for the purpose herein described.

186 2. A staple-driving device, A, having the flat tubular external case, A^3, longitudinally grooved at one side thereof, in combination with the driving-bar A^2, provided with the stiffening-rib a^2 a^2 a^2, arranged to occupy the said longitudinal groove, substantially as described.

3. In combination with the detachable staple-driver A, the slotted clamping-arm D L, together with the base B, having the recessed block J, the whole constructed to operate substantially as and for the purpose herein set forth.

4. In combination with the base B and spring E, the clamping-arm D L, having slot M and heel O, substantially as described.

5. A means for filing and binding papers, consisting of a base-board, C, upon which are mounted one or more paper clips, B D, having clinching-blocks J and slots L, with or without the pins F, together with the staple-driver A, the whole constructed to operate substantially as herein shown and described.

ISAAC W. HEYSINGER.

Witnesses:
C. H. HERSHEY.
W. H. RICHARDS.

(Here follows diagram marked p. 187.)

188 UNITED STATES PATENT OFFICE.

ISAAC W. HEYSINGER, of Philadelphia, Pennsylvania.

Machine for Inserting and Clinching Staples.

Specification forming part of Letters Patent No. 274,941, dated April 3, 1883. Application filed March 15, 1882. (No model.) Patented in England April 14, 1880, No. 1535.

To all whom it may concern:

Be it known that I, Isaac W. Heysinger, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful improvements in machines for inserting and clinching metallic staples, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

This invention relates to a new and useful improvement in machines for driving and clinching staples in papers, cloths, leather, wood, and other similar articles; and it consists in a modification of and improvement upon my staple-driving machine, patented to me April 13, 1880, under the title of "Improvement in devices for filing and binding papers," the official number of said patent being 226,402, although there are parts of the present invention which bear no reference to and are not dependent upon anything shown, described, or claimed in the foregoing letters patent No. 226,402.

The improvements which form the subject of this present application are adapted to all forms of staple driving and clinching tools, either hand or power, and may be applied thereto, if desired.

This invention and the mode of operation thereof are partly illustrated in figures 1, 2, 8, 9, and 10 of my letters patent of Great Britain, No. 1535, dated April 14, 1880, and granted to William Robert Lake, as trustee for me, the inventor thereof.

In my invention, as exhibited in the drawings hereto annexed, the case which holds the driving-plunger, and into which the staple is inserted preparatory to being driven, is readily removable from and replaceable in the machine for the more convenient insertion of a staple in said case; and the driving mechanism is adapted to be used independently of the clinching-anvil for driving staples into wood-work when no clinching is desired, as in upholstering furniture, putting down carpets, &c.; and one of the improvements over the form shown in my previous letters patent of the United States, above described, consists in the construction and mutual arrangement of the detachable staple-driver and its case and clinching-anvil, whereby said case may be so placed as to drive a staple, either crosswise or lengthwise of the base-plate of the machine, although other improvements are hereinafter shown and described as a part of my invention.

In the accompanying drawings, figure 1 is a longitudinal section vertically through the middle of the tool, the staple-driver being in position for driving a staple crosswise of the base-plate of the ma-

chine. Fig. 2 shows the flat front of the staple-driver, the same being in the proper position, when inserted in the machine, for driving a staple lengthwise of the base-plate. Fig. 2ª is a cross-section of the lower part of the staple-driver, showing the driver and its case, the latter having the open groove for the projection of the loop of a suspension-ring staple, as hereinafter described. Fig. 3 shows a staple-driver provided with a laterally-projecting handle, adapted to be used with this machine. Fig. 4 shows the clinching portion of the base-plate or anvil, over and above which is the guide-arm, shown at Figs. 5, 6, and 7; and Figs. 8 and 9 show various positions in which staples and suspension-rings may be inserted and clinched by the use of this machine.

It will be seen by reference to Fig. 1 that the clinching device consists of a base-plate, B, over which is a guide-arm, pivoted or otherwise attached to the base-plate, so as to vibrate thereupon, and preferably provided with a thumb-lever at the rear end thereof, by means of which the slotted guide-arm may be raised from the anvil K.

In my previously-described letters patent of the United States No. 226,402 I employed a spring in conjunction with a heel behind the pivoted bearing of the movable arm, so that when pressure was applied to the thumb-lever of the guide-arm, which also acted as a spring paper-clamp, the heel would pass under the pivoted bearing, and the guide-arm would be locked in an open position, from which it could be closed with a snap by pressure applied to the slotted end of the said guide-arm, and thus drive the papers down upon a pin provided therefor in the base part of the tool. In the present invention, however, I do not employ a pin or analogous device, and the guide-arm does not act as a spring paper-clamp, nor is it
189 locked in an open position in the manner described in my previous letters patent aforesaid; but the arm is made to vibrate with reference to the clinching-anvil, and is adjustable, so as to adapt it to receive papers of varying bulk or thickness and guide the open end of the removable staple-driver accurately against the upper side of the same.

It is obvious that instead of pivoting the guide-arm to the base-plate B, as shown in Fig. 1, it may be otherwise attached, provided it be arranged to have its slotted end freely open and close with reference to the anvil K; and in certain cases, also, the thumb-lever may be dispensed with, as is shown in Figs. 4, 5, 6, and 7.

B is the base-plate, over which is the slotted guide-arm D, the object of which is to guide the detachable case A^3 down over the clinching-grooves J J′ of the anvil K of the base-plate B.

A^3 is the case in which the driving-plunger A^2 moves. When desired, the plunger may be retracted in its case by a spring, as shown at Fig. 2; but the spring is not essential, as the plunger A^2 may be readily retracted by the hand, which, after a little practice, is done without thought, and this construction gives greater compactness to the tool when boxed for the trade, and is also cheaper to make.

In the face of the anvil K are shown two transverse clinching-

grooves, which cross each other, and have sloped or concaved ends. These cruciform grooves allow the driver, when guided by the collar or socket L L′, to bring the staple down over either one or the other, so as to clinch the legs of the same either crosswise or lengthwise, according to the position of the driver above. These grooves may be indifferently of any of the forms of clinching-grooves in common use, and they not only serve to bring the legs together, which would also be accomplished by a mere dish-shaped depression, and which has been used for such purposes, but also prevent lateral displacement, and bring them together upon the same line as that of the crown of the staple, whereby much better finished work can be done than when the grooves are dispensed with, the clinch also being stronger.

The case A^3, in its external form, is made of such shape as to prevent the involuntary rotation thereof in the collar, slot, or socket L L′ of the guiding-arm D, which collar is made large enough and of such internal form as will allow the case A^3 to be easily inserted and withdrawn, and it will be seen that the case may be so inserted as to drive and clinch a staple either crosswise or lengthwise of the base-plate, as may be desired.

The staple-driver which I commonly use is that shown and described in my letters patent of the United States and Great Britain above referred to; but any of the forms of portable staple-driver in common use may be employed instead, provided it be made of such external form as to permit the insertion of the nose thereof in the collar, slot, or socket of the guide-arm, either crosswise or lengthwise of the base-plate, and at the same time prevent the involuntary rotation of the same therein.

To insert a staple in the case A^3, it is most convenient to remove said case from the collar, slot, or socket L L′. The staple is inserted with its legs pointing downward, its shoulders and legs fitting into the sides of the grooved case A^3. The staple should be made to either fit accurately in the case A^3, or else with its legs slightly diverging from each other, so that when inserted in said grooves the legs of the staples will have a slight elastic outward pressure against the sides of the grooves of the case A^3 to prevent the staple from falling out. The staple being thus inserted in the case A^3, the article to be penetrated (if the staple is to be clinched) is placed upon the anvil. Said case is then inserted, either crosswise or lengthwise of the base-plate B, in the guiding collar, slot, or socket L L′, and said case, fitting somewhat loosely therein, will by its own weight drop down upon the article to be stapled. Then a single stroke with the hand upon the head A′ of the plunger will drive the staple-legs through the papers, card, or other fabric, and completely clinch them down upon the lower side of the same. The detachable driver may be used separately when desired.

The tool is also adapted to drive and clinch wire or other staples having a projecting loop or ring at one side of the crown of the staple. For this purpose I usually, when the loop is of considerable size, enlarge the rear portion of the collar, slot, or socket L L′, so as to enable the loop to pass readily through the guide-arm, and thus

project from the edge of a show-card or pamphlet laid beneath. It is manifest that an opening or enlargement upon the front side of the collar, slot, or socket L L′ would not accomplish the same purpose, as in that case the loop of the suspension-ring would lie down upon the body or face of the show-card, and would not project from the edge thereof, making the device worthless for this purpose.

When the case of the driver is cylindrical in form it is advisable to have a projecting nipple or two or more vertical grooves to fit corresponding grooves or a nipple upon the inner surface of the collar, slot, or socket L L′, so that the case A^3 may be inserted in the guiding-collar in the proper position and retained therein while the staple is being driven. It is manifest that said grooves should occupy such positions that when the nipple is in either the one or the other of the grooves adapted thereto the driving-blade of the plunger will coincide with one or the other, as may be desired, of the clinching-grooves in the face of the anvil. It is plain that other means for guiding said case in the collar, slot, or socket L L′, equivalent to those herein described, may be adopted without departing from the principles of my invention, and hence I do not strictly limit myself to said means above described.

I am aware of the invention described and claimed in my
190 letters patent of April 13, 1880, in which, in connection with a detachable staple-driver, a clinching-base is employed, provided with a spring-clamping arm to compress the papers down upon the clinching-anvil, or a pin provided for that purpose, and to stand open when the arm is raised by the passage of a heel upon the clamping-arm beneath the bearing thereof, as shown and described in said letters patent, and I do not herein claim such guide-arm when used as a paper-clamp actuated or operating as described and claimed in said letters patent, but disclaim the same as a part of this invention.

I am also aware that clinching-anvils having crossed clinching-grooves have been employed in connection with staple-drivers not capable of being rotated upon their axes, in which four staple-grooves and a four-feathered plunger were employed, by means of which a four-pronged staple or two two-pronged staples could be inserted and clinched upon transverse lines; but my present invention does not relate to the construction or operation of such mechanism, nor do I make any claim thereto.

Having now described my invention and the operation thereof, what I claim is—

1. In a machine for inserting and clinching staples, the base-plate B, having the anvil K, provided with two transverse clinching-grooves, J J′, and over said anvil the guide-arm D, provided with guiding-collar L L′, in combination with a detachable staple-driver having staple-case A^3 and plunger A^2, the whole constructed to operate substantially as and for the purpose described.

2. In a machine for inserting and clinching staples, the combination of a clinching-anvil provided with a clinching-recess which is adapted to receive a staple upon different transverse lines, and over it a guide-arm, together with a detachable staple-driver, which may

be guided to its place over said recess by said guide-arm, and inserted so as to drive and clinch a staple either lengthwise or crosswise of the clinching-base, substantially as described.

3. In combination with the recessed base B, having over it the guide-arm D, provided with guiding-collar L L′, the rear portion of which is enlarged so as to allow the passage of the loop of a suspension-ring staple, a detachable staple-driver having an opening in one side of the case thereof, so as to allow a suspension-ring staple to be inserted in said case, the loop of the said staple projecting laterally from the said opening, the whole arranged to operate substantially as and for the purpose described.

4. In combination with a fixed anvil provided with a clinching-recess which is adapted to receive a staple when driven upon different transverse lines, and over it a guide-arm, a staple-driver which may be withdrawn and partly rotated upon its axis preparatory to driving a second staple, substantially as described.

5. In combination with a base, B, having a recessed clinching-anvil, K, and over said anvil a vibrating guide-arm vertically adjustable in relation to said anvil, and provided with a guideway for the reception of the open end of a detachable staple-driver, a thumb-lever which by being depressed will cause the elevation of said guide-arm, substantially as and for the purposes herein set forth.

6. In a machine for driving staples, the combination of a recessed clinching-anvil and vibrating guide-arm, which may be raised or depressed with reference to said clinching-anvil to accommodate varying thicknesses of paper, and provided with a guiding-collar near the free end of said guide-arm, with a staple-driver having a case, A^3, driving-plunger A^2, and hand-knob A′, the whole being adapted to be withdrawn from the said guiding-collar for charging with a staple and reinserted therein for driving and clinching the same, substantially as herein shown and described.

7. A staple-clinching device consisting of a base provided with a recessed clinching-anvil which is adapted to receive a staple upon different transverse lines, and projecting over said recess a vibrating guide-arm having near its free extremity a guideway for the reception of the open end of a detachable staple-driver, the whole being adapted to drive and clinch staples upon different transverse lines, substantially as described.

8. In a device for inserting and clinching metallic staples, the combination of a recessed clinching-anvil, a vibrating guide-arm provided with a thumb-lever at its rear end, and a staple-driver which is adapted to operate with said guide-arm against said clinching-recess, substantially as described.

ISAAC W. HEYSINGER.

Witnesses:
P. O. DONNELL.
F. L. ROEPKE.

(Here follow diagrams marked pp. 191 & 192.)

2 Sheets—Sheet 1.

G. W. McGILL.

Staple-Inserting Machines.

No. 220,934. Patented Oct. 28, 1879.

Fig. 13.

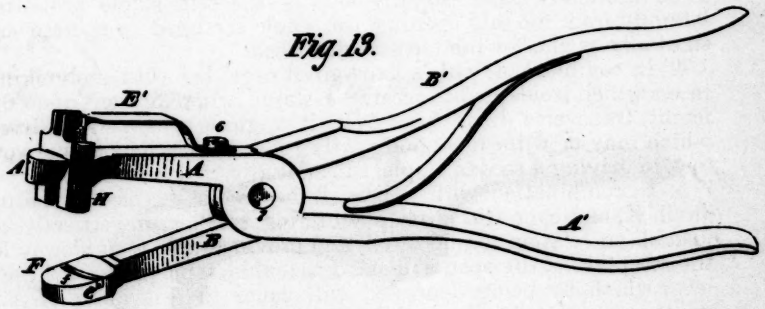
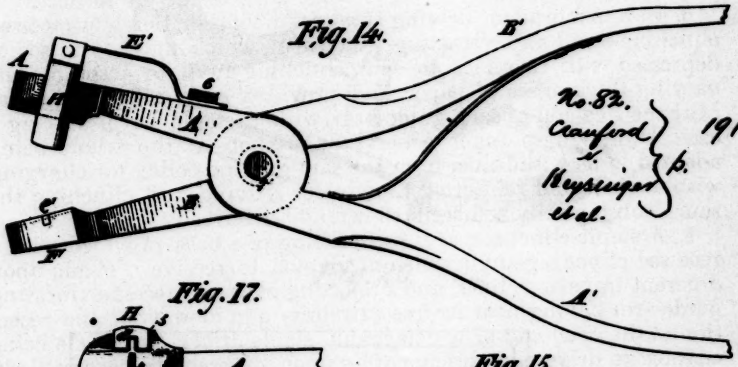


Fig. 14.



No. 82. Crawford & Keysinger et al. 191.

Fig. 17.

Fig. 15.

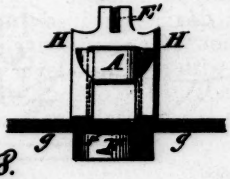


Fig. 16.

Fig. 18.

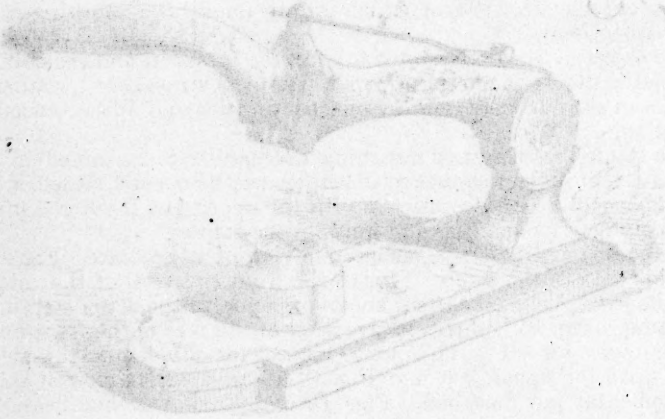
WITNESSES:

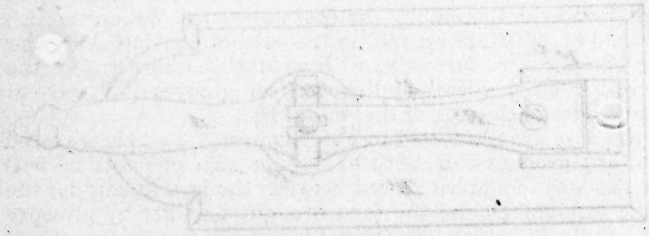
Gustavus Dietrich

Linton Coombs

INVENTOR:

Geo. W. McGill





193 UNITED STATES PATENT OFFICE.

GEORGE W. MCGILL, of New York, N. Y.

Improvement in Staple-Inserting Machines.

Specification forming part of Letters Patent No. 220,934, dated October 28, 1879; application filed June 20, 1879.

To all whom it may concern:

Be it known that I, George W. McGill, of the city and county of New York, in the State of New York, have invented certain new and useful improvements in the construction of the staple-inserting machine patented to me by United States letters patent No. 212,316, dated February 18, 1879, of which improvements the following is a full description.

The object of this invention is to effect the insertion and clinching of metallic staples in sheets of paper, pamplets, straw-board, leather, cloth, and similar materials by one continuous and instantaneous operation.

The staple inserting and clinching mechanism is contained in a pair of jaws hinged together so that they may be opened, closed, and pressed together; and connected with the upper jaw there is a supplemental jaw for holding and guiding the staples.

In sheet 1, figure 13 is a perspective view of my device. Fig. 14 is a side view of the same. Fig. 15 is a front end view of the same with its jaws closed on several sheets of paper, in the act of stapling the same. Fig. 16 is a perspective view of the face of the front end of the upper jaw. Fig. 17 is a face view of the supplemental jaw in place upon the upper jaw, and Fig. 18 is a perspective view of said supplemental jaw detached. Figs. 19 and 20 show a modification of my device.

The front end of the jaw A has a broad face, having in each side or cheek vertical slots 5 5, to receive the supplemental jaw, in the form of a saddle, H, which is inserted therein with its legs pointing downward, and held therein by the free end of the flat spring E′, the other end of which is secured to the arm of the jaw A by the screw 6. The jaw A is furnished with vertical feathers *d d* in the slots 5 5, which enter corresponding vertical grooves *d′ d′*, formed in the inner sides of the legs of the saddle H.

When the jaws are connected by the pivot-pin 7 a staple is placed in the guiding-grooves *d′ d′*, with its legs or shanks pointing outward, the goods to be stapled placed between the jaws and under the ends of the saddle-legs, and the jaws brought together by pressure upon the handle A′, which movement forces the staple-legs out of the guiding-grooves *d′ d′* through the articles being bound, and down on the clinching-blade *e′* in the anvil F, in a manner similar to that described in my said patent No. 213,316.

The central portion of the broad face of the jaw A projects beyond the rest of the jaw, so as to enter and force the stapled part of the articles being bound into the depression or channel *f* of the clinch-

ing-anvil, in the same manner and for the same purpose as the foot of the plunger F in my aforesaid patent operates; and it is also provided with a cross-groove, 4, similar to that in said plunger-foot, to cause the feet of its feathers *d d* to rest on the shoulders of the staple, for the purpose of causing the bottom of its feathers *d d* to rest upon the shoulders of the staple, to prevent the downward bowing of the staple-head.

In the modification of my machine represented in Figs. 19 and 20 of sheet No. 2, the inserting and clinching mechanism is precisely the same as above described, the only difference being that in this modification the arm carrying the clinching-anvil is made in the form of a bed-plate, B′, adapted to be screwed to a table, and the arm A′ carrying the upper jaw, with its inserting and clinching mechanism, is pivoted to a pillar, F^3, rising from the rear end of said arm or bed-plate B′, and said arm A′ has a handle, A, extending beyond the inserting and clinching-jaws, by which it is vibrated.

What I claim as my invention in this application is—

1. The combination of the anvil F, the vibrating jaw A, the supplemental jaw or saddle H, and spring E′, constructed, combined, and arranged substantially as described.

2. The combination of the fixed anvil F, the vibrating jaw A, supplemental jaw or saddle H, and spring E′, all constructed, combined, and arranged to operate substantially as described.

In testimony that I claim the foregoing as my invention I hereunto affix my signature in presence of two witnesses.

GEORGE W. McGILL.

Witnesses:
HENRY SCOTT.
W. R. NOÉ.

(Here follows diagrams marked pp. 194, 195, & 196.)

197 UNITED STATES PATENT OFFICE.

MORTON TOULMIN, of Washington, District of Columbia.

Paper-Fastening Machine.

Specification forming part of Letters Patent No. 267,283, dated November 7, 1882; application filed April 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, Morton Toulmin, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful improvements in paper-fastening machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

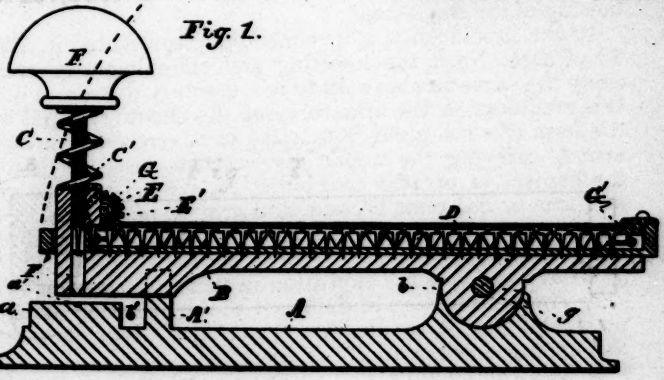
(No Model.) 3 Sheets—Sheet 1.

M. TOULMIN.

PAPER FASTENING MACHINE.

No. 267,283. Patented Nov. 7, 1882.

Fig. 1.



No. 82. Crawford v. Heysinger et al. p. 194

Fig. 2.

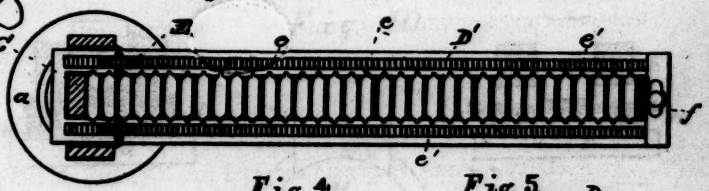


Fig. 3

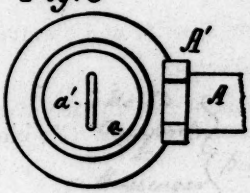


Fig. 4

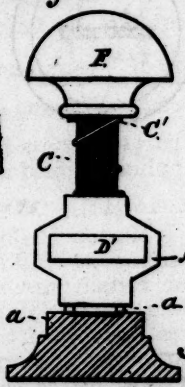
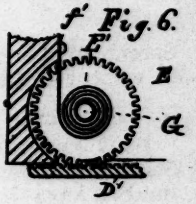


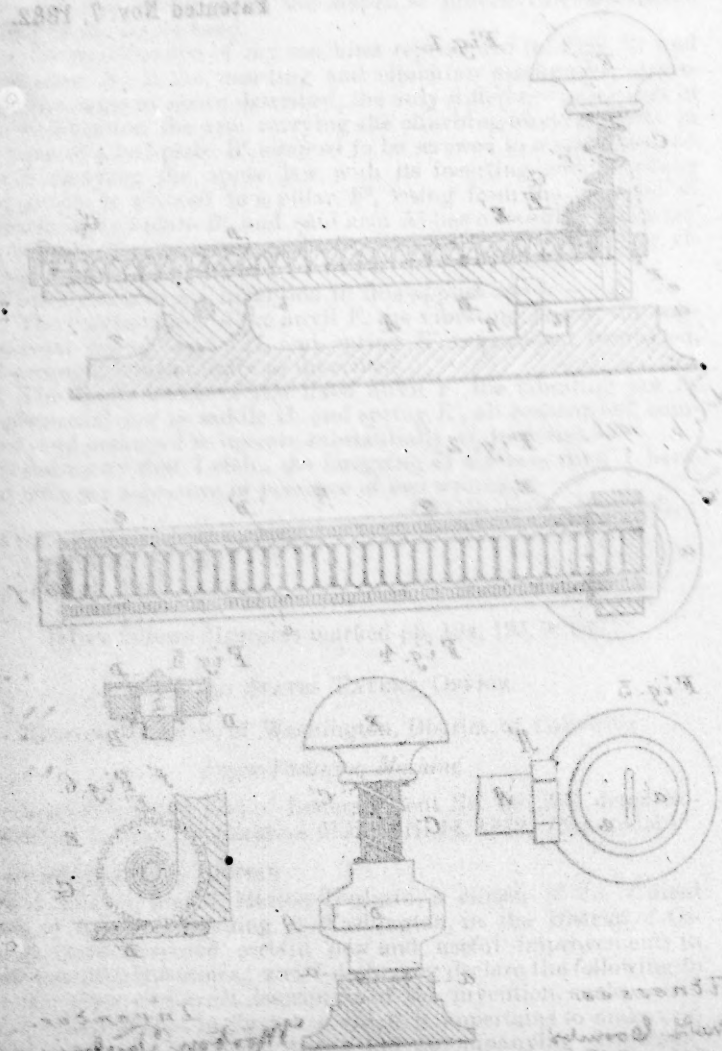
Fig. 5.

Fig. 6.



Witnesses.
Chas. L. Coombs
Chas. D. Davis

Inventor.
Morton Toulmin
By H. Aubrey Toulmin
his Attorney.



(No Model.) 3 Sheets—Sheet 3.

M. TOULMIN.

PAPER FASTENING MACHINE.

No. 267,283. Patented Nov. 7, 1882.

Fig. 7.

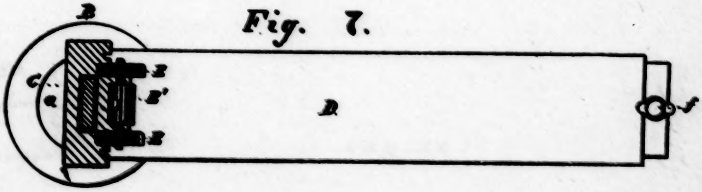


Fig. 8.

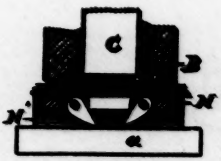


Fig. 10.

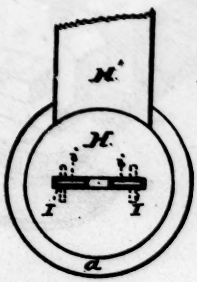
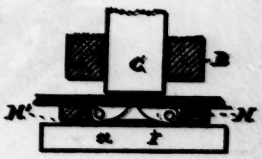


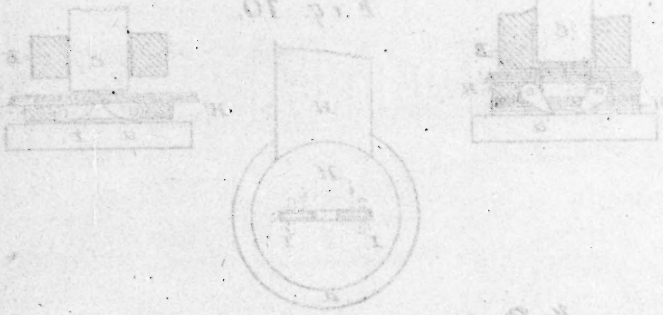
Fig. 9.



No. 82. Crawford v. Heysinger et al. } p. 195

Witnesses.
Chas. L. Coombs
Edwin D. Davis

Inventor
Morton Toulmin
By H. Aubrey Toulmin
his Attorney.



(No Model.) 3 Sheets—Sheet 3.

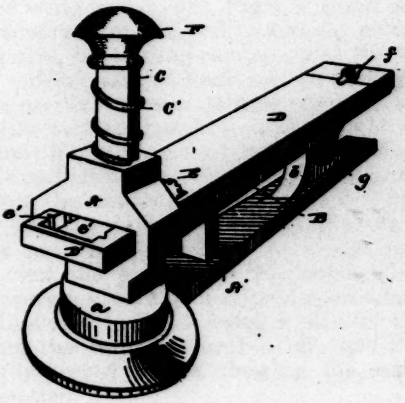
M. TOULMIN.

PAPER FASTENING MACHINE.

No. 267,283. Patented Nov. 7, 1882.

No. 82. Crawford & Reysinger et al. p. 196

Fig. 11.



Witnesses.
Edwin L. Yeiser
Chas. D. Davis

Inventor.
Morton Toulmin
By H. Aubrey Toulmin
his Attorney.

My invention relates to improvements in paper-fastening devices, and it has for its object to provide a cheap and simple machine for the purpose of uniting or fastening papers together; and it consists of certain means whereby a quantity of the fastenings may be stored up ready for a continuous feed; of means for automatically supplying them to a forcing or driving plunger; of a forcing piston or plunger; and, finally, of mechanism for clinching the fastenings after their passage though the paper or material being connected or united together, all of which will be hereinafter more fully pointed out and described.

Those skilled in the art to which this invention has relation will readily understand the same, by reference to the annexed drawings, forming a part of this specification, on which like letters refer to corresponding parts, and in which—

Figure 1 is a longitudinal vertical sectional view though my device at or about the center thereof. Fig. 2 is a view partly in section and partly in plan elevation, the forward end or head of the oscillating arm being in horizontal section in a plane just above the staple-carriage and the latter in plan, the cover or top plate being removed; Fig. 3, a plan view of the clinching-anvil and guiding-standard, the base-piece being broken off; Fig 4, a front elevation, the anvil being in vertical section; Fig. 5, a vertical cross-section through the oscillating arm, the feeding-carriage, and the cover or cap thereof; Fig. 6, a vertical longitudinal section through a portion of the head of the oscillating arm, feeding-carriage, and feed-wheel shaft; Fig. 7, a like view to that shown in Fig. 2, the machine being in plan and section; Fig. 8, a vertical sectional view of a portion of the head of the oscillating arm and a modification of my clinching device, showing the staples partially inserted through the several layers of paper, and the guiding and turning pawls in position to bend or fold the projecting points of the staples or fastenings; Fig. 9, a similar view, the plunger in this instance being entirely down, and the operation or act of clinching the fastenings completed; Fig. 10, a like view to Fig. 3, being a plan of the anvil and clinching-pawls, and the bed-piece broken off; and Fig. 11, a perspective view of my improved device, showing the same complete and ready for operation.

The letter H designates the base or bed-piece of my device, which is constructed of metal, preferably cast, and which is provided with an anvil, *a*, at one end thereof, a bifurcated guiding-standard, A′, for a purpose hereinafter named, and an extension near the other end. This extension is suitably pivoted, hinged, or otherwise flexibly connected, an oscillating arm, B, having a longitudinal groove or way, *d*, the object of which will presently appear, and which sustains a staple-feeding carriage, D′. This carriage consists of a rectangular or other conveniently-shaped frame, D′, having an opening, G, the inner walls of which are oppositely notched or vertically grooved, as shown at *e*′, into which grooves are adapted to fit the staples or fastenings used for securing the papers together. This feeding-casing laterally embraces the arm B, as shown in Fig. 5, and has a cross-bar, G′, at its rear end, which acts as a support, the said bar

resting upon the upper faces of the arm B. The forward end of this carriage is guided and supported by being passed through a suitable opening in the vertical extension of the arm B. One or both sides of the upper surface of this carriage are formed into or have attached to them racks or toothed portions *e*, which serve, in conjunction with suitable pinions or cogs engaging therewith, to give the carriage the proper forward travel for the purpose of feeding the staples to the forcing mechanism. The fastenings are supplied to the carriage by inserting them into the vertical grooves *e'* above mentioned, the under sides of their body portions being supported by contact with the upper face or top part of the arm B, as shown in Fig. 5.

198 The letter D designates a top cover, made of metal or other suitable material, which fits snugly over the carriage, excluding dust, &c., from being collected in the teeth of the racks *e* and hides them and the fastenings from view, the said lid or cover being retained in place by a button, *f*, or other suitable device attached to the arm B.

To the vertical extension of the arm B or other convenient part of said arm is journaled a cross-shaft, G, which is provided with pinions E E, adapted to gear or engage with the racks *e* and impart to them a forward movement by virtue of the rotary motion they receive through the medium of the recoil force of the spring E' exerted upon the said shaft G, to which one end is rigidly secured, the other or free end being fixed or connected to the arm B, at *f'*.

In some instances I may dispense with the racks and pinions and use only the cross-shaft (which would then be firmly held in its journals to prevent rotation), and the spiral spring, the latter being connected to and wound around the shaft in such manner that its contraction or recoil force would act to operate the carriage, the free end of the spring being distended and attached to the latter at any suitable point thereof.

I may also, in some instances, dispense altogether with the spring and shaft, pinions and racks above alluded to, and employ a helical spring, as seen in Fig. 1 of the drawings, the same being located in a channel formed therefor, as well as for the purpose of reducing weight in the upper surface of the arm B, its respective ends having connection with the carriage and arm, respectively.

The letter F' indicates a vertical passage or aperture in the forward end of the arm B, within whose vertical plane is a clinching-groove, *a'*, formed in the upper surface of the anvil *a*. The lower terminus of this passage is provided with inclined staple-guides *b'*, whose faces converge downwardly, and which are located one in each angle or corner of said passage, their lateral dimension being approximately equal to the thickness of the staple-points, or the distance between the ends of the body of the staples and the vertical faces of the points thereof, the lateral space between the guides being always slightly more than the length of the staple-bodies, in order to permit the unobstructed descent of the latter through the passage F' during the act of fastening a staple.

The letter C indicates a plunger or piston, of metal or any suit-

able material, which snugly fits into said passage F′, and which is adapted to slide freely therein. The upper end of this plunger is provided with a knob or handle, F, for the purpose of forcing it down, and about it is placed a helical spring, C′, located between the knob and the head of the arm B, the function of which spring is to raise the plunger to its normal position.

In the figures of the drawings numbered 8 9 10, as above described, is shown a modification of my improved clinching mechanism. The letters A, B, C, and *a* therein shown designate respectively a portion of the base-piece of my machine, the oscillating arm, the vertical plunger, and the anvil. The letter H′ indicates a flat spring, secured to the base A, and extending forwardly over and above the anvil *a*, to which is attached or forming a part of which is a disk, H. This latter is slotted, as indicated in Fig. 10, to receive two pawls, I, pivoted therein. These pawls are grooved on their respective upper faces or edges to receive and prevent lateral displacement of the points of the staples during the act of clinching them.

The operation of my invention will be readily understood from the following explanation thereof, when taken in connection with the above description. The staple-feeding carriage being loaded, as hereinbefore stated, the action of the spring E, through the medium of the pinions and racks, causes it to travel forward until one of the staples is suspended in the passage F′. The paper to be fastened together is then laid upon the anvil *a* in proper position, when the oscillating arm B is let down upon it, the bifurcated standard A′ serving to receive the said arm and guide and hold it in the desired position, and preventing it from any lateral displacement which might occur by reason of any looseness in the pivot-joint *b g*. The hand is applied to the knob F, by which the plunger *c* is forced down through the passage F, forcing before it the staple, supended as above mentioned. The points of the staple enter the flaring space between the guiding-lugs *b′*, and are thus directed against the paper in a vertical or nearly vertical position (according to the position of the arm B), through which they pass, and come in contact with the groove *a′*, whose inclined bottom throws them together, whence they are finally bent up tightly against the paper and thus complete the fastening.

When I use my clinching modification shown in Figs. 8, 9, 10 substantially the same operation as that above described takes place, with the exception that in the latter case the staples, instead of entering the grooves *a′*, enter the grooves in the pawls I, and are thus clinched, when the spring H is overcome by the mediate pressure of the plunger C, and disk H brought firmly down upon the anvil *a*, and the pawls I made to assume a horizontal position, as seen in Fig. 9.

When the hand is removed from the knob the helical spring elevates the plunger above the horizontal plane of the staples, and the recoil of the spiral and its appurtenances advances another staple in the passage F′, ready for a second operation, and so on after each descent and operation of the plunger.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. In a paper-fastening machine, the combination of a bed-
199 piece provided with a clinching-anvil with an oscillating arm flexibly connected thereto, having a traveling staple-carriage, constructed substantially as described and shown, and means for automatically operating the same, and mechanism for forcing the staples to and through the paper, substantially as described and herein set forth.

2. In a paper-fastening machine, the combination of a bed-piece provided with a clinching-anvil and guiding-standard with an oscillating arm flexibly connected thereto, having a staple-carriage adapted to slide thereon and to receive and hold separately a quantity of staples, means for automatically operating said carriage, and a staple-passage and forcing-plunger fitting therein, substantially as and for the purposes described.

3. In a paper-fastening machine, the combination of a bed-piece provided with a clinching-anvil and a guiding-standard with an oscillating arm flexibly connected thereto, having a staple-carriage adapted to slide thereon and to receive and hold a quantity of staples, and provided with a rack or racks engaging pinions journaled to said arm, a spring for operating them, and a staple-passage and plunger, substantially as and for the purposes set forth.

4. In a paper-fastening machine, the combination of a bed-piece provided with a clinching-anvil and guiding-standard with an oscillating arm flexibly connected thereto, having a staple-passage, a forcing-plunger fitting therein, a pinion or pinions, and a spring for operating the same journaled thereto, and a traveling carriage adapted to slide thereon and to receive and hold separately a quantity of staples, and provided with a rack or racks engaging said pinions, substantially as and for the purpose described.

5. In a paper-fastening machine, the staple-carriage, consisting of a frame having suitably-spaced grooves or notches for holding the staples separately, whereby a quantity may be fed into the machine at a time and each staple delivered to the clinching mechanism without affecting the others, substantially as herein specified.

In testimony whereof I affix my signature in presence of two witnesses.

MORTON TOULMIN.

Witnesses:
J. J. McCARTHY.
EDWIN L. YEWELL.

(Here follow diagrams marked pp. 200, 201, 202, 203.)

4 Sheets—Sheet 1.

G. W. McGILL.

Device for Inserting Metallic-Staples in Paper, &c.

No. 212,316. Patented Feb. 18, 1879.

No. 82. Cranford v. Meysinger et al. b. 200

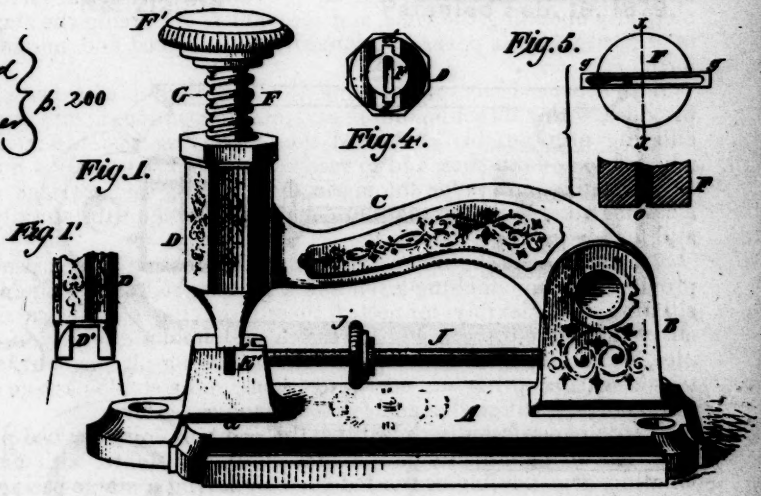


Fig. 1.

Fig. 1'

Fig. 4.

Fig. 5.

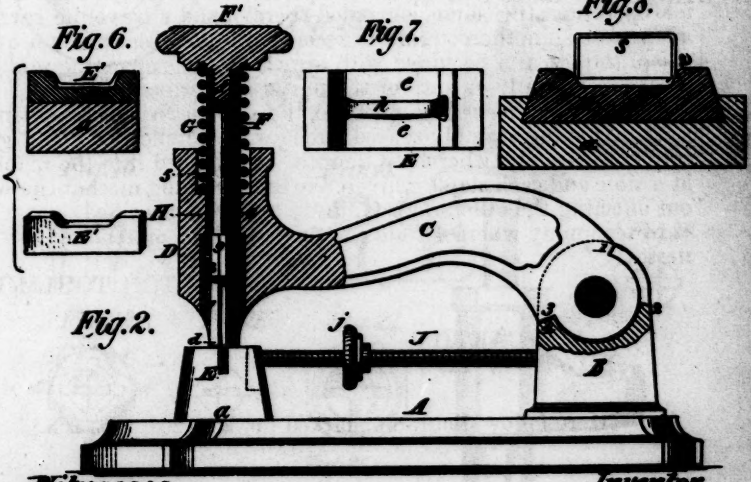


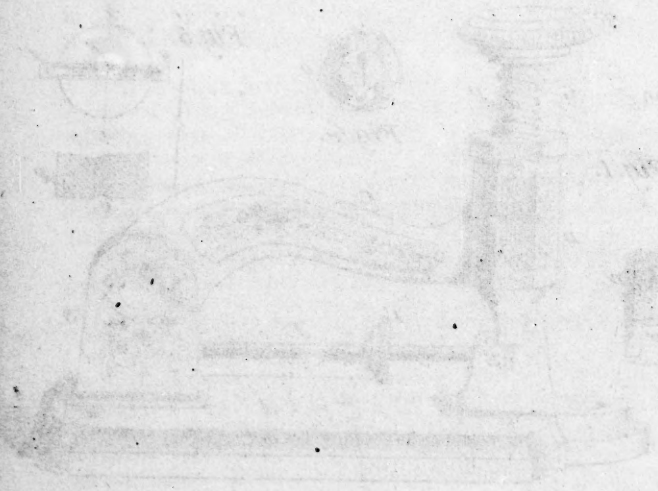
Fig. 2.

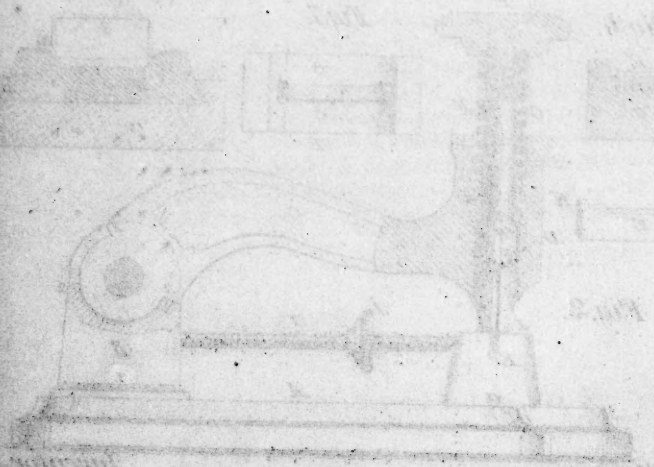
Fig. 7.

Fig. 8.

Witnesses
Gaylard Distanch
Victor Coombs

Inventor:
Geo. W. McGill





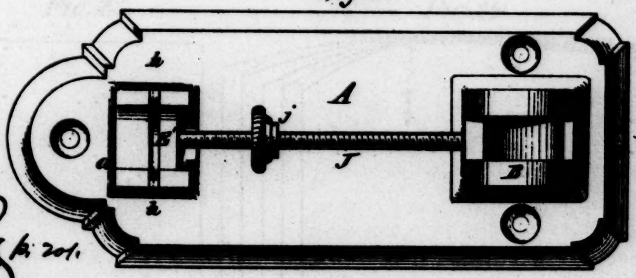
4 Sheets—Sheet 2.

G. W. McGILL.

Device for Inserting Metallic-Staples in Paper, &c.

No. 212,316. Patented Feb. 18, 1879.

Fig. 3.



No. 82, Crawford & Mayninger et al. vs. 201.

Fig. 9.

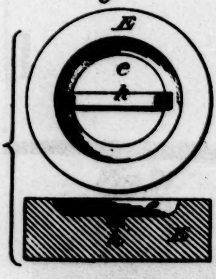


Fig. 11.

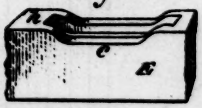


Fig. 12.

Fig. 10.

Fig. 13.

Fig. 14.

Fig. 15.

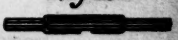


Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

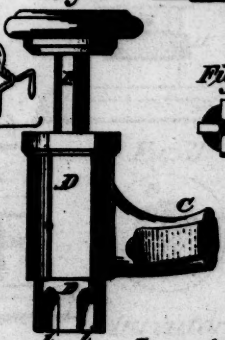


Fig. 26.

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 25.

Witnesses.

Gustave Dietrich

Victor Coombs

Inventor.

George W. McGill

4 Sheets—Sheet 3.

G. W. McGILL.

Device for Inserting Metallic-Staples in Paper, &c.

No. 212,316. Patented Feb. 18, 1879.

No. 82.
Crawford
&
Spencer
et al.
p. 202.

Fig. 23.

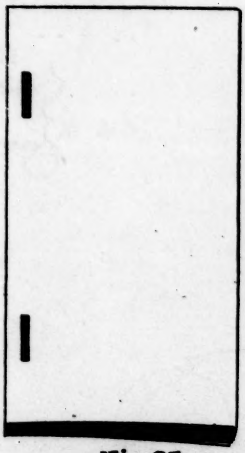


Fig. 24.

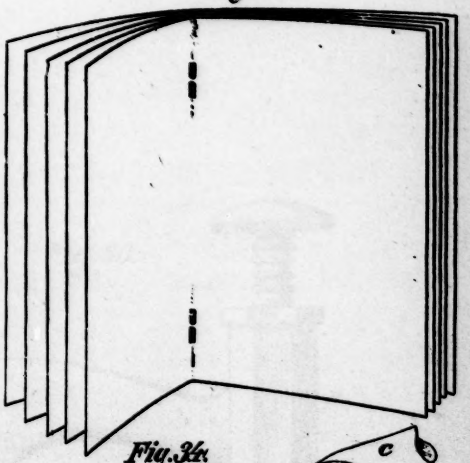


Fig. 27.

Fig. 34.

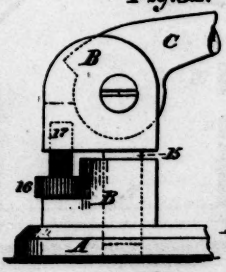


Fig. 33.

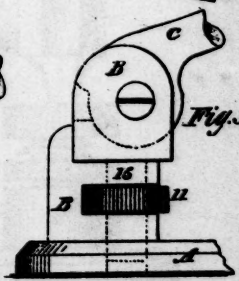


Fig. 28.

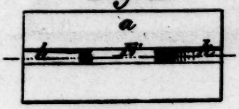


Fig. 31.

Fig. 32.

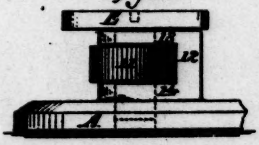
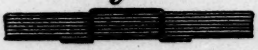


Fig. 29.



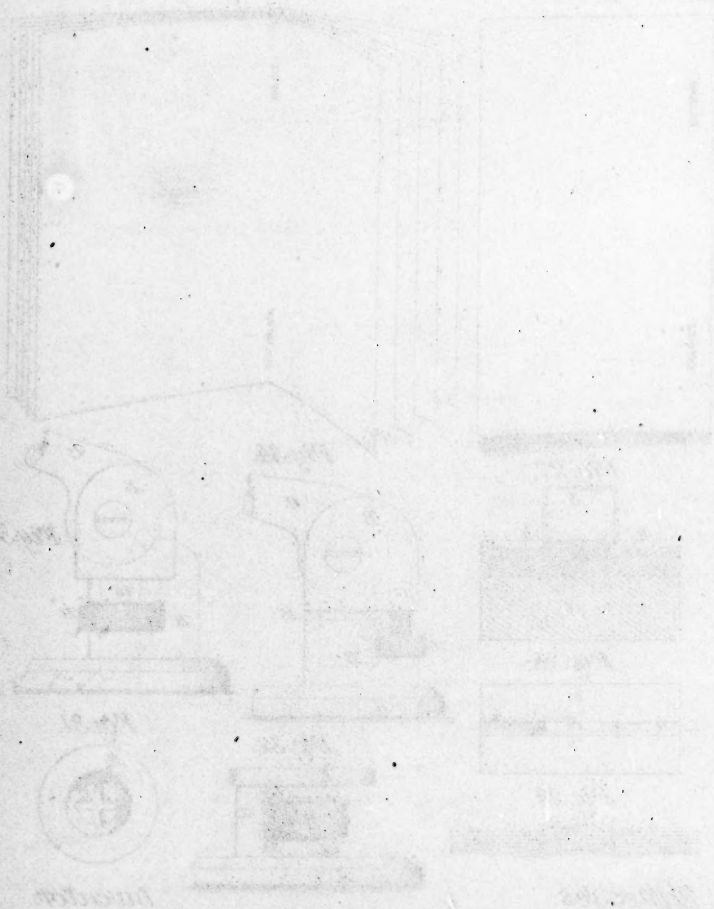
Witnesses.

Gustave Dietsch

Victor Coombe

Inventor.

Geo. W. McGill



4 Sheets—Sheet 4.

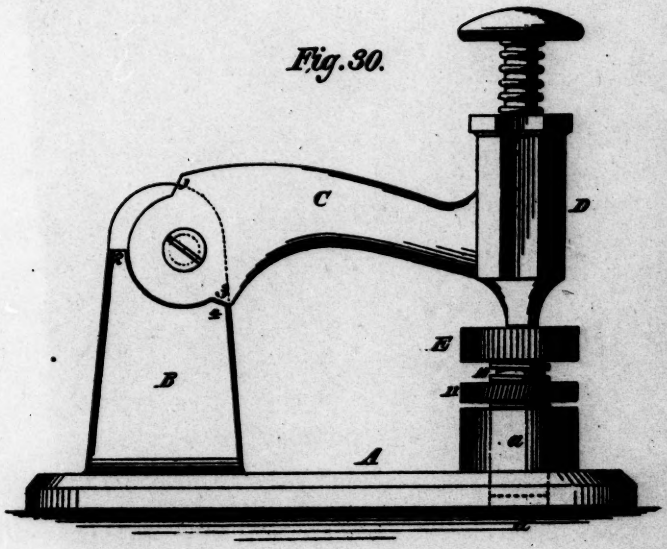
G. W. McGILL.

Device for Inserting Metallic-Staples in Paper, &c.

No. 212,316. Patented Feb. 18, 1879.

No. 82, Crawford & Hagemeyer et al. v. McGill, 203.

Fig. 30.



Witnesses.

Gustav Dietrich

Vinton Coombs

Inventor.

Geo. W. McGill

204 UNITED STATES PATENT OFFICE.

GEORGE W. MCGILL, of New York, N. Y.

Improvement in Devices for Inserting Metallic Staples in Papers, &c.

Specification forming part of Letters Patent No. 212,316, dated February 18, 1879; application filed January 9, 1879.

To all whom it may concern:

Be it known that I, George W. McGill, of the city and county of New York, in the State of New York, have invented a new and useful device for inserting metallic staples in papers, &c., for the purposes of binding, of which the following is a description:

The principal object of my invention is to effect the insertion and clinching of a staple in sheets of paper, pamphlets, or other articles to be bound, by one continuous and instantaneous operation or movement of the device.

My invention in the present instance is arranged as a hand-press; and consists of a bed-plate, furnished at its front end with a clinching-anvil, and at its rear with a pillar, in which is pivoted one end of a lever-arm, the other end of which is provided with the mechanism for inserting the staple in the articles to be bound, and which, in connection with the anvil, clinches the staple in said articles.

In the accompanying four sheets of drawing, figure 1 represents a side elevation of the device in perspective, consisting of a bed-plate, A, anvil *a*, clinching-anvil blade E′, lever-pillar B, lever C, case D, plunger F, spiral spring G, and screw-gage J. Fig. 2 is a longitudinal section of the device; and Fig. 1′ is a front view of the lower part of case D. Fig. 3 is a plan view of the bed-plate, clinching-anvil plate, and lever-pillar. Fig. 4 is a bottom view of the case D, with the plunger F inserted. Fig. 5 is a bottom view and vertical section of the face of the plunger F, enlarged. Fig. 6 is a cross-section of the anvil *a*, with its clinching-blade E′ inserted, and also a side view in perspective of the clinching-blade; and Fig. 10 is a perspective view of this anvil complete. Figs. 7, 8, 9, 11, 12, and 13 show the clinching-anvil plate E, constructed in a manner that the one and same blow which inserts the staple in the object being bound will clinch its penetrating-points on the other side of the same. Figs. 14, 16, 17, and 18 represent different forms of staples, which the device is adapted to insert; and Fig. 15 represents a staple as applied by the device, binding together the several sheets of paper. Fig. 19 represents a side elevation of the case D, modified, for a purpose hereinafter described; and Figs. 20, 21, and 22 represent modifications in those parts of the device correspondingly lettered in the other figures. Figs. 23 and 24 represent two different es of stapling pamphlets. Fig. 25 represents a four-legged e adapted to be used in my device, modified as hereinafter de- ed; and Fig. 26 represents the said staple with its shanks ned. Fig. 27 is a top view of the anvil and blade E′, showing

a reversal of its mortising or grooving. Fig. 28 is a cross-section of the same, with a staple entering its grooves; and Fig. 29 represents a staple applied in binding, having its shanks clinched by being spread apart by this reversed grooving of the face of the clinching-blade E'. Figs. 30, 31, 32, 33, and 34 represent a further modification in the construction of those parts of the device correspondingly lettered in the other figures.

My invention consists of a metal bed-plate, A, provided at one end with an anvil, *a*, and at the other end with the mortised pillar B, connected together by a gage, consisting of a screw-bar, J, upon which a thumb-screw nut, *j*, revolves, intended and adapted to regulate, in binding, the line or point of stapling. In the mortised pillar B is pivoted one end of a lever-arm, C, arranged to swing up and down therein, the other end of which is provided with the vertical case D, in which is arranged the staple-driving mechanism. The anvil *a* is provided with a steel clinching-plate, E', having its surface mortised or grooved, to clinch the staple-legs after the same have been driven through the articles being bound, or equivalently arranged without the plate E, as hereinafter described. The rear or hinging end of lever C is provided with the shoulders 1 and 3, to rest against corresponding shoulders 2 and 4 in the pillar B, to prevent it from being thrown too far back or dropped too far forward or down, which latter check is only required where the anvil or pillar is made adjustable, as will be explained hereinafter.

The staple-inserting mechanism consists of the case D, plunger F, and spiral spring G, which are constructed and put together as follows: The case D is provided with a cylindrical chamber, H, running vertically through its center, and divided into the sections 5, 6, and 7 by different degrees of diameter, its lower section, 7, being furnished with the staple-groove *d d*, cut vertically in its opposite sides. The plunger F, which is intended to be moved up and down in the chamber H, consists of a cylindrical metal rod, having at its base an enlargement or foot, 8, which latter is provided on opposite sides with the feathers *g g*. The upper end of the plunger is provided with a cap, F', secured thereto by the screw-connection *f*. The cap F' being removed, the capping end of the plunger is run up through the chamber H, its foot occupying the upper portion of section 7 and the feathers *g g* in the grooves *d d*. The spiral spring G is placed over the upper end of the plunger, and its lower portion, surrounding the same, passed down into section 5 of the chamber H. The cap F' is screwed onto the plunger, which locks both it and the spring G in the case D, as shown in the drawings. The first coil of the upper end of the spring G enters an annular groove in the under surface of the cap F', for its better security. The office of the spring G is to hold the plunger up in the chamber H, as shown in the drawings, and to bring it back to that position so soon as pressure is removed from its cap. The plunger F is of a length that, in connection with its spring G, on being pressed upon the bottom of its foot 8, will clear or pass down a little below the bottom of the case D. The bottom of the case D rests upon the face of the anvil-plate E. The bottom part of the case D, as shown in

Figs. 1, 2, 4, and 30, is beveled transversely, to leave open the base of the chamber H, and to assist the eye of the operator in inserting the staple at the required point or line.

The device is operated as follows: The lever C is raised until its shoulder 1 rests on shoulder 2 of the pillar B, which brings it on a slant back of the pillar B, turning upward and exposing to the operator the grooved base of the chamber H. A metallic staple of suitable size is inserted in the grooves *d d* in the foot of the case D, with its shanks pointing outward. The articles to be bound are laid upon the face of the anvil-plate E, and the case C dropped upon them, its weight holding them upon the anvil without preventing their being moved to any point desired under the case without the latter again being raised. The cap of the plunger being now struck or pressed upon, its feathered foot S is forced down upon the head of the staple, driving the shanks of the latter down out of the guiding and supporting grooves or staple-seats *d d* through the articles placed upon the anvil. The points of the staple-shanks, after passing through the goods, are bent in toward each other, and clinched up against the under side of such articles by being further driven by the plunger into the mortises or grooves of the anvil-plate E, which accomplish this end by being shaped as follows: The face of the anvil-plate E is chamfered out to form a shallow channel or sunken chamber, *e*, with a flat bottom and flaring sides, as shown in Figs. 7, 8, 9, 11, 12, and 13, which are drawn on a large scale to better illustrate their formation. The flaring channel or ditch *e* commences at its top with a diameter slightly wider than the staple-seat or chamber *d d* in the case D, and with the position of which it corresponds, and flares sufficient to make the diameter of its flat bottom less than the diameter of the case-chamber H proper, as shown in the drawings.

The bottom of the channel *e* is crossed by the transverse groove *h*, which is made slightly wider than the grooves *d d* of the staple-seat, and with the position of which it corresponds, and of a depth to correspond to the thickness of the metal in the staple used. This cross-groove *h* extends into the flaring sides of the channel or ditch *e*, and has its ends curved sharply downward from the upward portion of said flare, as shown in the drawings. The points of the shanks of the staple, on being driven through the objects being bound, strike the flaring sides of the channel *e* above the cross-groove *h*, as shown in Fig. 8, where *s* represents the staple, and, continuing down into said cross-groove *h*, are bent inward by its quickly-curved ends, and guided on the same line toward each other by the grooves proper; and the papers or other articles being bound, being forced down in the channel *e* by the face of the plunger, further clinch and bend the lower part of the shanks of the staple until they lie flat against the under surface of such goods, with their points turned into the same.

The curved or chamfered ends of the cross-groove *h*, where the latter is sunk in the face of the anvil proper, and independently of the channel *e*, will be found somewhat too shallow to properly bend and clinch the staple-shanks up flat against the under surfaces of

the articles being bound. The office of the channel *e* is to admit the portion of the goods clasped by the staple being forced down into said channel, and thereby assist in the clinching of the staple-shanks, as hereinbefore described. The channel or chamber *e* may be made round or cup-shaped, as shown in Fig. 9, wherein a plan or face view and a cross-section of the anvil-plate is shown; or the face of the plate may be chamfered out to form a channel or ditch with flaring sides, as shown in Figs. 7 and 8, Fig. 7 being a plan or face view, and Fig. 8 a cross-section, showing the position of the staple-shank when entering its flaring channel and cross-groove, as before described; or the anvil-plate may be given this form in the manner shown in Figs. 11, 12, and 13, wherein Fig. 11 represents a perspective view of the anvil-plate channelled and grooved in a manner equivalent to the other figures, Fig. 12 being a top or face view, and Fig. 13 a cross-section. The ends of the cross-groove *h* of the anvil-plate are represented in the drawings flaring outward as well as upward. The object of their outward flare is to overcome any slight displacement of the staple-shanks in passing through the articles being found.

206

The cheapest and consequently the preferable way of constructing this form of anvil-plate is shown in Figs. 1, 2, 3, and 6, wherein the upper surface of the anvil *a* is chamfered or ditched from front to back, as before described, and provided with a transverse slot, in which is inserted a blade, E′. This blade is ditched deeper than the face of the anvil, so that on being inserted in its transverse slot they jointly form the cross-groove *h*, for the reception and clinching of the points of the staple, as before described.

In a press having both its anvil and lever-pillar stationary, as shown in Figs. 1 and 2, the face of the anvil ought to occupy a line sufficiently low to cause the case D, when it rests upon it, to point out a little obliquely therefrom, leaving to the thickness of the object bound to bring it to a vertical position, or a position slightly oblique in an opposite direction, which arrangement facilitates the proper working of the device and the insertion of staples in articles of considerable thickness.

The face of the plunger F is provided with the cross-groove or grooves O, extending across it on a line with and partially into the face of its feathers, its office being to assist in holding the staple in firm position while being inserted in the articles being bound, and throw the pressure of the plunger principally upon the shoulders of the staple-shanks.

The feathers *g g* may be cast or wrought on the foot of the plunger F; or the base of the plunger may be provided with a cross-slot, having a steel plate inserted therein, with its ends projecting beyond the sides of the plunger, as feathers therefor, as shown in Fig. 5. The enlargement of the base of the plunger (foot 8), and the consequent enlargement of the diameter of the lower portion of the case-chamber H (section 7), may be omitted, as the shoulders of the feathers *g g* will serve the same purpose, which is to properly limit the upward movement of the plunger in the case-chamber H; and the case-chamber and plunger may be made of a form other than cylindrical

without interfering with the proper working of the device, so long as the shape of one corresponds to and fits the other.

It is manifest that this machine is adapted to insert and clinch staples of the various forms represented in Figs. 14, 16, 17, and 18, upon which staples, however, no claim is made.

A staple provided with almost any shape or struck-up form of head may be inserted with this device by mortising out the face of the plunger F, so that the bottom of its feathers will always rest on the top of the shanks or shoulders of the staple.

The staples herein shown and described form no part of my present invention.

The open slot D′ in the face of case D, Fig. 1′, gives room for an enlarged or extended head of the staple.

Figs. 19, 20, 21, and 22 represent a modification in parts of the device to enable it to receive and insert a staple on lines crossing each other at right angles, and adapt it to bind pamphlets, sheet-music, and other papers, in manner as shown in Figs. 23 and 24, Fig. 23 representing a pamphlet bound by having the staple passed through the inner margin of its folded leaves and clinched thereon, and Fig. 24 represents a pamphlet bound by having the staple passed through the center or fold of its sheets and longitudinal therewith, its clinching points occupying the inside of the fold.

To accomplish this latter mode of binding, the entire foot of the case D is made cylindrical in form, as shown in Fig. 19, and not beveled to open the base of the chamber H, as shown in the other figures; and the section 7 of said chamber H is provided with an extra pair of staple-grooves, *d′ d′*, for the reception of a staple on a line longitudinal with the press, as shown in Fig. 20, which is a bottom view of the case D, having its chamber H so grooved, and a similar view of the plunger F inserted therein and correspondingly feathered, as is separately shown in Fig. 21, *g′ g′* being its extra feathers.

The face of the anvil-plate E is provided with a corresponding extra groove, *h′*, as shown in Fig. 22.

A two-pronged staple being placed in the grooves *d′ d′* in manner similar to that heretofore described, the pamphlet to be bound, as shown in Fig. 24, is placed on the anvil with its center fold over the groove *h′*, the staple-case lowered, and the staple inserted and clinched in the fold of the pamphlet by a blow upon the plunger-cap, as herein-before described.

This latter mode of stapling is especially adapted to news and illustrated papers, sheet-music, copy-books, &c., where it is desirable to have the leaves open to their full extent.

The vertical chamfers *i i i i*, Figs. 19 and 20, on the outside of the foot of the case D, are intended for ornamentation and to assist the eye of the operator in getting the articles to be stapled in proper line under the staple.

Four-pronged staples, such as shown in Figs. 25 and 26, may be inserted with a press thus modified, and the press may be similarly modified to receive and insert staples of any number of prongs.

Fig. 28 represents a face view of the anvil-blade E′ with its chan-

neling or grooving reversed, so as to spread the staple-legs from each other instead of bending them in, as shown and described in the other figures, Fig. 27 being a longitudinal section of the same, taken on its line *x x*, and showing a staple, S, entering the grooves, while Fig. 29 represents several sheets of paper bound with a staple so applied.

The advantage of this mode of clinching consists in its ad-
207 mitting the use of staples with long or short shanks in binding articles of the same bulk or thickness.

Figs. 30, 31, 32, 33, and 34 represent a modification in parts of the device, by means of which the lever-pillar B, or the anvil-plate E, or both, are made adjustable, to admit of their being raised or lowered, according to the thickness or bulk of the object through which the staple-shanks are being driven, causing the shanks to pass through such object in a direct vertical line, which greatly facilitates their insertion and the after-clinching of their ends or points on the anvil-plate. In a press having a short-lever arm, this construction will be found of advantage in binding objects of considerable volume or thickness.

The adjustable anvil shown in Fig. 30 is constructed as follows: In the anvil *a* is formed the vertical cylindrical chamber *a'*, running down through it and the bed-plate A (represented in dotted lines in the drawings), and having its interior surface screw-threaded to receive the screw-base 10 of the anvil-plate E, which is inserted therein. The anvil-plate is raised and lowered, as desired, by turning it in opposite directions. It is set with the cross-grooves of its clinching-face under and corresponding with the staple-seat *d d* of the case D, and is secured in such position by the set-screw nut 11.

Fig. 31 represents the face of the anvil-plate, with its clinching-grooves crossing each other in manner similar to that shown in Fig. 22, the object of such arrangement in the present instance being to bring one of its cross-grooves on a line under the staple-seat *d d* of the case D with every quarter-revolution of the anvil-plate.

In Fig. 32 the anvil is represented constructed somewhat on the principle of a screw or monkey wrench, and possesses the advantage of having a fixed up-and-down movement, which obviates the necessity, on each change in the height of the anvil-plate, of setting its face-grooves to correspond to the staple-seat in the case D. In this instance the anvil proper consists of the upright 12, connecting the upper and lower jaws, 13 and 14. These jaws are pierced by a square hole or socket, through which passes the base 10 of the anvil-plate E, which in this instance is made square, with threaded corners to receive the set-screw nut 11, set between the jaws, and by means of which the plate is raised, lowered, and set in position. In a similar manner, and as an equivalent to the adjustable anvil, and to secure similar results, the pillar B of the device may be made adjustable, as is shown in Fig. 33, wherein the pillar is made in two pieces, its upper section, in which the lever C is pivoted, being provided with an extension, 15, similar to the base 10 of the anvil-plate described in Fig. 32, and its lower section constructed in a manner similar to the anvil proper in said figure, and operated therein by a

corresponding set-screw nut, 11; or the pillar may be constructed as shown in Fig. 34, wherein the base-extension 15 of its upper section is made without the screw-edges described in the last figure, and is inserted in a square socket or chamber running vertically through the high or inner portion of the lower section of the pillar, and is moved up and down therein by the screw-bolt 16. The headed or lower end of the bolt is fixed in the lower or outer portion of the lower section of the pillar, so as to admit of its being revolved therein, but not removed therefrom. The other end of the bolt enters a screw-chamber, 17, in the upper or adjustable section of the pillar, as shown in the figure by dotted lines. Revolving the screw-bolt in one direction will raise the upper or adjustable section of the pillar, and a reverse movement will lower it.

What I claim as my invention is—

1. The vibrating lever C, case D, chamber H, with grooves *d d*, plunger F, with feathers *g g*, and spring G, in combination with the anvil *a*, having on its face a sunken channel, *e*, and transverse groove *h*, all constructed and arranged to operate substantially as described.

2. In combination with the vibrating lever C, case D, carrying the staple-inserting mechanism described, and the anvil *a* and gage J *j*, all substantially as and for the purpose described.

3. In a staple-inserting machine constructed to operate substantially as herein described, the staple-guiding grooves *d d*, opening vertically into the opposite sides of a wide chamber, H, to adapt the machine to receive and insert a metallic staple, having its head or body portion wider than its shanks, substantially as described.

4. In a staple-inserting machine constructed to operate substantially as described, an open slot, D′, in the face of the case D, to adapt it to receive and insert a suspending staple, having an extended or looped head, as herein set forth.

5. In combination with the case D and plunger F, with mechanism, substantially as described, for receiving and inserting a staple, an anvil, *a*, having in its face a sunken channel or concavity, *e*, with a shallow flat transverse groove, *h*, having its ends curved upward into the flaring sides of said channel or concavity, so that a single blow upon the plunger will insert and completely clinch the shanks of the staple, as herein set forth.

6. In a staple-inserting machine constructed to operate substantially as herein described, the face of the anvil *a*, so sunken or concaved as to adapt it to receive below its top surface the foot of the plunger F and that portion of the article being bound, to assist in the clinching of the staple-legs, substantially as herein set forth and described.

7. In a staple-inserting machine constructed to operate substantially as herein set forth, a plunger, F, with four feathers fitting into four guiding-grooves, as shown, in combination with an anvil having across its concave face two grooves, *h′ h′*, as shown, for the
208 purpose of inserting and clinching a two-pronged staple on transverse lines or a four-pronged staple, substantially as described.

8. In a staple-inserting machine constructed to operate substantially as described, the case D, adapted to receive and hold a staple, and containing mechanism for inserting and clinching the same, as described, mounted on the end of a vibrating lever, adapted to be raised to and stand in a suitable position for placing the staple therein, substantially as shown and described.

9. In a staple-inserting machine constructed to operate substantially as described, the plunger F, having the lower portion of its opposite sides provided with the feathers *g g*, to fit and move in the vertical grooves *h h*, formed in the opposite sides of the chamber H, and its face mortised or grooved in a manner to throw the pressure of the plunger principally upon the shoulders of the staple being operated upon, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of the subscribing witnesses.

GEORGE W. McGILL.

Witnessess:
HENRY SCOTT.
FRANK S. SCRIMGEOUR.

(Here follow diagrams marked pp. 209, 210.)

211 UNITED STATES PATENT OFFICE.

DANIEL M. SOMERS, of New York, N. Y.

Improvement in Machines for Inserting and Clinching Metallic Staples.

Specification forming part of Letters Patent No. 200,774, dated February 26, 1878; application filed November 26, 1877.

To all whom it may concern:

Be it known that I, Daniel M. Somers, of the city, county, and State of New York, have invented an improvement in machines for inserting and clinching metallic staples, of which the following is a specification:

This invention relates to that class of machines which are adapted to insert metallic staples through one or more thicknesses or sheets of paper, cloth, and similar material, and fasten the same by clinching their protruding legs down onto the face of the material.

The invention consists in a machine so constructed that one continuous operation of its devices inserts the staple through the material and clinches its legs down upon the face thereof, the particulars of which are too fully hereinafter set forth to need preliminary description.

In the drawings illustrating this invention, figure 1 is a plan view of the machine; Fig. 2, a longitudinal section; Fig. 3, a rear elevation taken on the line *a b* of Fig. 2; Fig. 4, a plan view of the rest-block; Fig. 5, a section thereof taken on a line at right angles to that upon which the section, Fig. 2, is made. Fig. 6 shows a staple and a suspension-ring, and Fig. 7 a guide-plate, by the aid of

D. M. SOMERS. 3 Sheets—Sheet 1.

Machine for Inserting and Clinching Metallic Staples.

No. 200,774. Patented Feb. 26, 1878.

No. 82, Crawford & Mayninger et al. v. 209

Fig. 1.

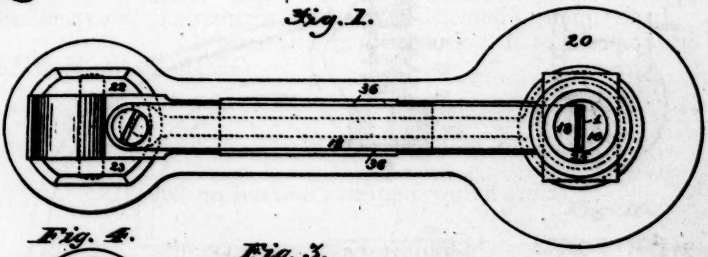


Fig. 4.

Fig. 3.

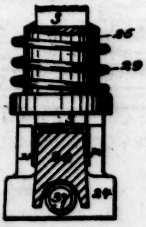


Fig. 5.

Fig. 2.

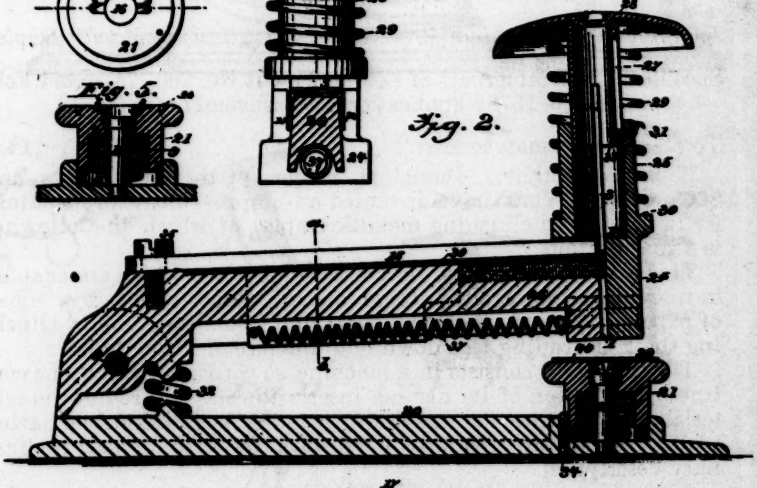


Fig. 6.

Fig. 7.

Witnesses;

A. Scott

M. Crawford

Inventor

Daniel M. Somers,

by Munson & Philipp

Attys.

142

8.
tiall
and
as d
raise
ther
9.
tiall
oppo
vert
and
of th
oper
In
in th

W

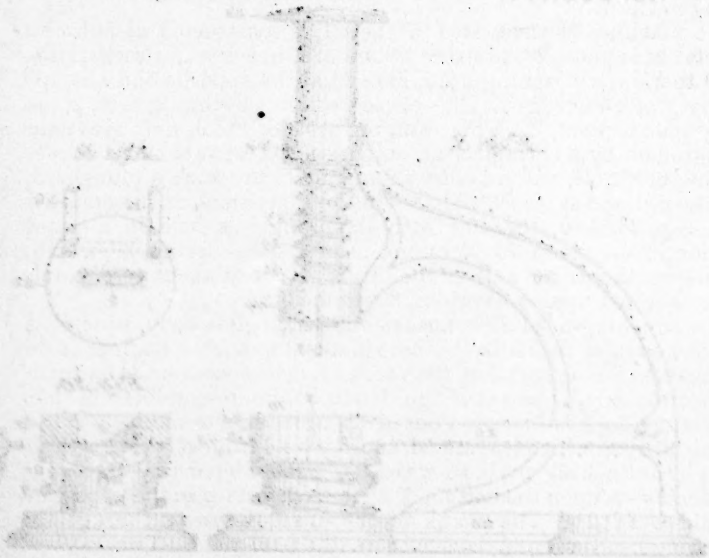
211

Imp

Spe

To

B
Stat
for
is a
T
to i
of p
ing
T
tinu
teri
ula
nar
I
vie
ele
rest
to
stap



which said suspension-ring may be attached by means of a staple Fig. 8 represents a modification of the machine. Fig. 9 shows a plan view of the staple-guiding block, and Fig. 10 a section of the staple-guiding block and the rest-block. Figs. 11, 12, and 13 show the staple-clinching mechanism adapted to another form of staple-setting machine.

The machine, as illustrated in sheet 1, is constructed as follows: A metal base-plate, 20, supports at one end, in a circular socket provided therein, a clinching-head, 21, and at the opposite end has upwardly-projecting lugs 22 23, between which a swinging arm, 26, is hung upon a pivot, 2. This swinging arm 26, which may gravitate or be upheld by a spring, as 32, supports at its forward end a staple-guiding block, 24, and a hollow standard, 25, in which a plunger, 3, and the plunger-stock 27 slide. This plunger-stock is surmounted by a cap, 28, and, together with the plunger, is held in a raised position in the standard 25 by means of a spiral spring, 29, which, bearing on the under side of the cap 28, is coiled about said standard and seated upon a shoulder, 30, formed thereon.

The clinching-head 21 is formed with a circular body, which fits into the circular socket in the base-plate 20 in such a manner as to be capable of reciprocating therein, and it is prevented from turning horizontally by means of a guide-pin, 34, entering a slot in its side. This clinching-head is cored out at its under side to receive a spiral spring, 9, upon which it is seated, and it is held from vertical displacement by a clinching-anvil, 16, which has a shouldered head, the flange of which rests upon the bottom of a recess, 6, formed in the upper end of said head 21. The shank of the anvil 16 passes through the clinching-head 21, and is riveted in the base-plate. Two inclined slots, 7 8, opening into the recess 6, are cut into the face of this clinching-head, and their position and extent are such that they are aligned with and correspond in length to the slot 1 in the staple-guiding block 24. Their inclination is such that at their innermost ends their bottoms will preferably be nearly even with the upper face of the anvil 16, as is best observed in Fig. 5, and their inclination may form a straight or curved line, the latter being preferable, as their office is to bend the legs of a staple forced into them by the plunger 3 inwardly toward each other, so that they may be readily clinched down upon the material through which they protrude, as will presently more fully appear.

The plunger-stock 27 and the plunger 3, which is rigidly fixed to said stock, may, when the resistance of the spring 29 is overcome by pressure applied to its cap 28, slide in the standard 25, the plunger 3 moving in the guiding-slot 1, with which the staple-guiding block 24 is pierced, being prevented from protruding beyond the face of said guiding-block by the shoulder 33 of the plunger-stock 27, which seats itself upon the upper surface 10 of said block.

The swinging arm 26 is shaped in its cross-section so as to provide a flat top and slightly angular sides, as in Fig. 3, thus
212 forming a support adapted to receive and sustain a series of staples placed upon it, as in Figs. 2 and 3. These staples are held in place upon the arm 26 by means of a plate, 18, fixed by a

pivot, 35, so as to oscillate over said arm 26, being moved to one side when the staples are being placed in position and with its front end entering a recess cut into the standard 25 when holding said staples in place. (See Fig. 2.) This plate extends nearly up to the plunger 3, and, with the arm 26, forms a guideway which will perfectly direct the staples into the slot 1 in the guiding-block 24, passage-ways 11 12, Fig. 3, being cut into the rear sides of said block to admit the staples through it into said slot 1.

In order that the staples may be moved forward automatically a feeding-slide, 36, fitting over the arm 26 and moving under the plate 18, is provided. This slide is attached to one end of a spring, 37, whose opposite end is fastened to the rear of the block 24, by the resilient power of which spring the said slide constantly presses the staples forward against the front face of the slot 1, thus always holding one staple in said slot and consequently directly beneath the plunger 3 when the same is in its uppermost position, as in Fig. 2.

To operate this machine the sheets of paper or other material designed to receive the staple and be fastened together by it are placed in position upon the clinching-head 21, in the space between it and the staple-guiding block 24. The hand of the operator, pressing upon the cap 28, causes the swinging arm 26 to descend, thereby reciprocating the guiding-block 24 and causing it to clamp the material to be stapled between its face and that of the clinching-head 21; and when the guiding-block 24 is thus seated a continued pressure upon the cap 28 will cause the plunger 3 to descend and carry before it, through the slot 1, the single staple which the feeding-slide 36 has forced into and holds suspended beneath it in said slot 1. As the plunger 3 bears upon the entire surface of the crown of the staple and the staple-legs rest against the end walls of the slot 1 it is snugly confined on three sides and is thus so rigidly supported that as its legs are forced against the sheets of material they will enter and pass through the same, and as they protrude beyond the lower surface of the material they will enter the slots 7 8 in the clinching-head 21 and be turned or bent at angles toward each other. As the end of the plunger 3 when in its lowermost position is flush, or nearly so, with the under face of the guiding-block 24, it follows that at that time the crown of the staple must be pressed down snugly upon the upper surface of the material through which it has been forced and also that the protruding portions of its legs will have been bent toward each other as far as may be required by their length; and, as at this time the shoulder 33 of the plunger-stock is seated upon the upper surface 10 of the guiding-block 24, it also follows that any pressure then exerted upon the plunger-stock will be transmitted through the guiding-block 24 and the material upon it rests to the clinching-head 21, and if this pressure be sufficient to overcome the power of the spring 9 said clinching-head will be depressed or reciprocated vertically. Such a movement of the rest-block, taking place while the clinching-anvil 16 remains stationary, causes the bent ends of the staple-legs which rest upon or over by this anvil to be further bent and thus clinched down flat upon the

under surface of the material, while the plunger 3 remains seated upon the crown of the staple.

These operations are all caused by one continuous pressing movement applied to the cap 28, and when released the parts will all move upward together into the positions shown in Fig. 2, the stapled material being thus left free to be removed. The feeding-slide will also move forward and feed a new staple into the slot 1 under the plunger 3, so soon as it clears said slot, and the machine is ready to repeat the operation.

This machine is provided with means for attaching suspension-rings, such as that marked 38 in Fig. 6, which, though made of sheet metal in the common form—that is, with a ring, 49, and an attaching-shank, 48—has the ends of the latter perforated by holes 17 to receive the legs of the staple 51. To do this expeditiously a guide-plate, 39, having a recess, 40, in its face, into which the suspension-ring snugly fits, is adapted to be temporarily attached to the face of the clinging-head 21, as in Fig. 2, the means of its securement being pins 13, which enter holes, Fig. 5, therein. It is apparent that, when this guide-plate is adjusted in place, a suspension-ring, provided with the holes 17 and placed in the recess 40, will be attached to any material rested upon it, by means of a staple inserted and clinched by the mechanisms just described.

The mechanism for clinching the staple-legs may be of the construction shown in Fig. 10, wherein the clinching-head 21 is provided with a staple-leg-bending slot, as before, but which slot, in this instance, is provided at each end with pivoted clinchers 41 42, whose free ends rest upon the clinching-anvil 16. The upper faces of these clinchers are grooved, preferably to a depth equal to the thickness of the staple-legs, as is seen in the detached views of Fig. 10.

The clinching-head 21 is upheld, as before, by a spring, 9, which is here shown as applied outside of the anvil, and it has a pin, 19, limiting its upward movement.

In this modification the staple-guiding block 24, at the end of two swinging arms, 26, is shown as hinged to a standard, 50, and resting by gravity upon the clinching-head 21, as it may in the form of the machine shown in Fig. 2; and it is provided with an inclined front edge, as at 15, which may be extended as a finger-piece, 43. The object of this inclined edge, which may also be given to the clinching-head 21, is to facilitate the entrance of the material, the edges of which thus readily enter between the guide-block 24 and clinching-head 21; or, by means of the said finger-piece, the guide-block 24 may be conveniently raised to facilitate the entrance of the work.

213

The stock 27, carrying the plunger 3, plays in heads 44, in which it is spring-seated, while the other parts of this modification corresponding to those in the main machine are marked with like reference characters.

To operate the machine thus modified, a staple is entered into the guiding-slot 1 with its legs downward, the ends and sides of said slot being rounded to facilitate its introduction. (See Figs. 9 and 10.) This having been done, and the material to be stapled placed

between the block 24 and the clinching-head 21, as before, the plunger 3 is pressed down until it has entered the slot 1, engaged and carried the staple before it, forced the same through the material, and bent its legs inwardly by means of the inclined surfaces of the clinchers 41 42. This done, the shoulder 33 on the clincher-stock will have been seated upon the upper face 10 of the guiding-block 24, so that any further movement of it will, as before explained, cause the clinching-head 21 to descend. Now, as this clinching-head descends the stationary anvil 16 will cause the clinchers 41 42 to swing upon their pivots and press or bend the staple-legs snugly down onto the material, which may then be drawn out of the machine.

When the parts resume the position, Fig. 8, which takes place as soon as the pressure is removed from the cap 28, the operation may be repeated.

The clinching-head 21 might be made stationary, and the anvil 16 reciprocate within the same by means of an arrangement of levers operated at the proper time by the plunger 27; and in some instances the clinching mechanism may consist of a clinching-head, as 21, made stationary, and provided with a bending-slot, having its ends so inclined as to operate to turn the staple-legs down flat upon the material.

Either of the clinching mechanisms shown in Figs. 2 or 10 may be applied to an instrument which sets the staple with its legs uppermost—as, for instance, that forming the subject-matter of patent No. 195,603, which requires one movement to insert the staple and bend its legs, and a second movement to clinch them. In that instrument a clinching-head, as 45, Figs. 10, 11, 12, is provided with a bending-recess, the ends 7 8 of which are inclined, which driving-head bends the legs of a staple supported on an anvil, 46, inwardly, as they are pressed into its bending-recess, by bringing said head 45 down onto the anvil 46. This done, the work is moved forward, so as to carry the staple in it out of alignment with the bending-recess and over the smooth surface of a block, 64; and a second movement of the driving-head is made to press the staple-legs down onto the material.

In order to avoid the necessity for a second blow to clinch the bent staple-legs, the said clinching-head 45 is provided with my improved clinching mechanism—that is, the clinching-anvil 16 which slides therein may, when the clinching-head 45 is pressed down onto the material, be reciprocated to bear upon the bent staple-legs in the recess 7 8, and clinch the same snugly down upon the material before the parts clamping the same are disturbed with relation to each other or to the material operated upon. This clinching-anvil may be sustained against moving, with respect to the head 45, while the inserting operation is being performed, by means of a spring, 9, as in the structure, Figs. 1 to 10, or by a right-angular slot, 4, in which a stop-pin, 5, plays. In the latter form a swinging turn of the anvil at the end of the downward stroke of the clinching-head 45 permits its reciprocating movement.

When this form of the device is applied to the machine shown in Figs. 2, 8, a mechanical movement operated by the plunger 3 may throw off the stop-pin 5.

By my improvement, the movement necessary to insert the staple, bend its legs inwardly, and clinch them down upon the material, is practically a continuous or single one, which mode of operation is highly important and advantageous, as it does not admit of the staple getting out of place or canting before it is completely fastened or clinched into the material; and when the staples it sets are used as paper-fasteners, or for other similar purposes, this machine will be found desirable, for the reason that it so inserts the staples that their crowns are on the face side of the material.

The suspension-ring illustrated and described is not claimed herein; but

What is claimed is—

1. In a machine for setting staples, the combination, with a staple-inserting plunger, of a clinching-head, provided with a bending-slot, having inclined ends, and a clinching-anvil, the said clinching-head and anvil being constructed to reciprocate, with respect to each other, substantially as described.

2. The staple-clinching mechanism consisting of a reciprocating clinching-head, as 21, and a stationary anvil, as 16, having the clinchers 41 42, substantially as described.

3. The combination of the plunger 3, reciprocating staple-guiding block 24, and the clinching-head 21, having a bending slot, with inclined ends, substantially as described.

4. The combination, with the reciprocating staple-guiding block 24, and the plunger 3 operating through the same, of the clinching-head 21 and clinching-anvil 16, substantially as described.

5. The combination with the swinging arm 26 and staple-214 guiding block 24, of the feeding-slide 36 and passage-ways 11 12, substantially as described.

6. In a machine for setting staples, the combination of a reciprocating plunger, as 3, and a reciprocating staple-guiding block, as 24, with a staple-clinching mechanism, whereby the latter mechanism is automatically operated by said plunger, substantially as described.

7. The combination of the guide-plate 39, having a recess, 40, with the clinching-head 21 and staple inserting and clinching-mechanisms, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL M. SOMERS.

Witnesses:

H. T. MUNSON.

M. B. PHILIPP.

RESPONDENT'S EXHIBIT No. 22. J. S. Palmer Patent.

215 UNITED STATES PATENT OFFICE.

JOHN S. PALMER, of Providence, Rhode Island.

Letters Patent No. 90382, dated May 25, 1869.

Improvement in Devices for Setting Button-Hooks.

The schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, John S. Palmer, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful improved tool for setting button-hooks; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a side view.

Figure 2 is a face view of one of the jaws, showing the special improvement.

Figure 3 is a sectional view.

The tool herein described is to be employed in setting button-hooks, used as a substitute for eyelets, to hold shoe-lacings.

It consists of a pair of jaws, A A′, pivoted at *a*, and worked by the lever-handles C C.

One of the jaws is fitted to grasp the button-hook while it is being inserted, and the other carries the die-block, for bending and clinching its holding-prongs.

Into the face of one of the jaws A, a plate, B, is let in, and so arranged that it can be slid lengthwise, for a limited distance.

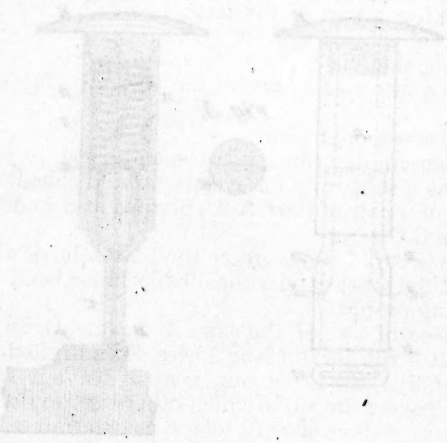
The end of this jaw is cut out, so as to leave it forked, and the sliding plate covers the space which otherwise would exist.

The range of motion of the plate B is determined by the length of the slot *b* cut through it, and by the screw-pin *c*, which stands in the slot, and enters the metal of the jaw beneath.

A thin plate, *d*, is placed over the sliding plate B, which former is adjustable, and serves as a gauge for the button-hook, and also as a means for increasing the friction upon the sliding plate, if the latter is too easily moved.

An aperture, *e*, is cut through the sliding plate B, of sufficient size to admit easily of the passage of the head of the button-hook, and the thickness of the plate is such, that when a button-hook is inserted in the aperture *e*, the plate will comfortably fill the space between the head and the base of the prongs formed by the bend *f* in its neck, Fig. 4.

To employ the tool for the purpose designed, the plate B is pulled forward, as in Fig. 2. The button-hook is inserted from the under



J. S. Palmer.

Attaching Buttons.

No. 90,382. Patented May 25, 1869.

Fig. 1.

No. 82. Crawford & Hayes et al. p. 216

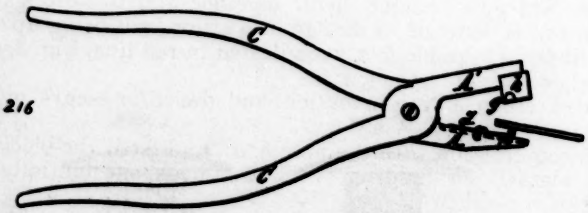


Fig. 2.

Fig. 3.

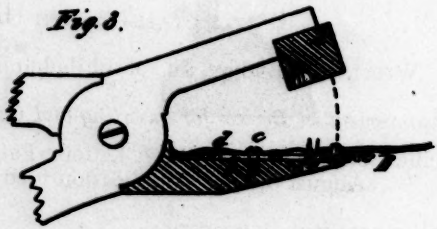
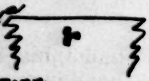


Fig. 4.

Fig. 5.



Witnesses

Charles W. Greene

Cerville Peckham

Inventor

John S. Palmer

side of the jaw, and hung upon the front edge of the aperture *e*, as seen in black at Fig. 3. The plate is then to be pushed inward until the button-hook brings up against the gauge-plate *d*, Figs. 1 and 3. The jaws are now brought together, the leather, or other material to which the hook is to be attached, being held over its points, as in Fig. 1.

The effect of bringing the jaws together is to cause the prongs of the button-hook, which are projecting upward, to prick through the material so held over them, and enter a conical cavity, *g*, in the fixed die-block *h*, located upon the other jaw A′, whereby the said prongs are bent inward.

The jaws are then allowed to open, and the material is pulled forward, which has the effect to slide outward the plate B, as in Fig. 2. The jaws are now brought again together, and the prongs of the hook, in consequence of its change in position, will bring up against the anvil-face of the block *h*, as indicated in red line, Fig. 3, and be clinched down, as in Fig. 4, *a*.

What I claim as my invention, and desire to secure by letters patent, is—

1. In combination with the jaws A A′, and fixed die-block *h*, the sliding plate B, for holding the button-hook, substantially as described.

2. The combination of the sliding plate B with the jaw A and the gauge-plate *d*, substantially as described.

JOHN S. PALMER.

Witnesses:
CHARLES W. GREENE.
ORVILLE PECKHAM.

(Here follow diagrams marked pp. 216, 217.)

218 UNITED STATES PATENT OFFICE.

WILLIAM J. BROWN, JR., of Philadelphia, Pennsylvania.

Improvement in Devices for Inserting and Clinching Metallic Staples.

Specification forming part of Letters Patent No. 218,227, dated August 5, 1879; application filed May 1, 1879.

To all whom it may concern:

Be it known that I, William J. Brown, Jr., of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented an improved device for inserting and clinching metallic staples, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to an improved hand device of easy and cheap construction adapted for inserting and clinching metallic staples in documents and other articles requiring to be fastened together.

Within a cylinder open at both ends is inserted a vertically-slotted tube, the upper end of which is arranged to fit snugly the lower portion of the cylinder within which it works. The lower portion of the tube is of taper or flat shape. At the top of this tube is a slotted disk for supporting a spiral spring arranged within the head of the outer cylinder. To the top of the cylinder is secured a cap or knob, to whose under side is secured a hammer-blade adapted to work vertically within the slotted tube and project downward and outward on the downward pressure of the knob. The metallic staple previously placed within the slot in the tapering portion of the tube is, by the above movement, driven out of the tube and into the material to be fastened.

In the drawings, figure 1 represents a side elevation of the device and an end view of the slotted tube. Fig. 2 represents a vertical section of the device in the act of inserting a staple in the material to be fastened. Fig. 3 represents the spring-supporting disk.

A represents the cylinder or handle, which is open at both ends to permit of the ready arrangement and working therein of the various parts. The upper end of this cylinder is preferably screw-threaded on its interior to receive a screw-threaded cap or knob, K; but this cap may be secured by other desired means.

B is a vertically-slotted tube arranged to snugly fit within the lower portion of the cylinder, its upper portion being cylindrical and snugly fitting the cylinder A, within which it freely slides, and is supported by the impact of the sides of the tube against the sides of the cylinder, the lower portion of the tube being flat or tapered to allow of the staples being readily inserted in the slot, and also to facilitate the insertion of said staples in a straight position within the articles to be fastened.

C is a hammer-blade or pusher, the upper end of which is attached to the lower portion of the knob K, its lower portion sliding vertically within the slotted tube B.

E represents a disk, which is carried by the upper end of the tube B, and serves to guide and stiffen the hammer-blade, and also acts as a support for the spiral spring S, arranged within the upper end of the cylinder. This disk E is slotted to permit of the hammer-blade passing through it.

d d represent shoulders formed on the hammer-blade C, to impinge on projecting corners formed on the inner surface of the tube to keep said blade within its prescribed limits.

P represents the sheets of paper or other material to be fastened together, and W represents a block or pad on which the material is laid. This block may be slotted to receive the projecting legs of the staple, or it may be of some soft or yielding material, as may be found most desirable.

In the operation of this device a metallic staple is placed within the slot in the lower portion of the tube B, points down. The tube is then held over the portion of the material P to be fastened. The staple may then be driven out, either by a simple hand-pressure upon the knob K or by violently forcing the lower end of the tube B against the material to be fastened. The hammer-blade C will, by

(No Model.) 220

W. J. BROWN, Jr.

DEVICE FOR INSERTING AND CLINCHING METALLIC STAPLES.

No. 260,365. Patented July 4, 1882.

No. 82. Crawford & Keysinger et al. p. 320

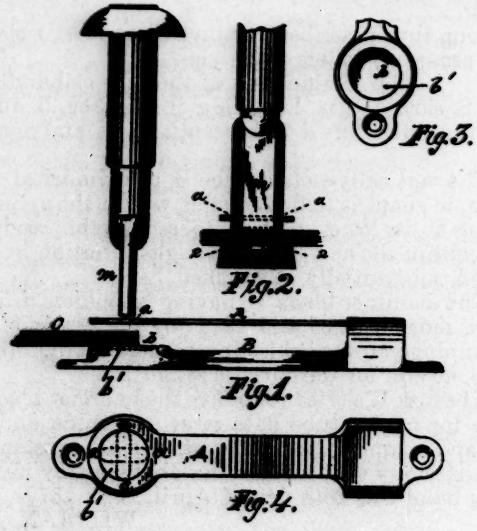


Fig. 3.

Fig. 2.

Fig. 1.

Fig. 4.

WITNESSES
Chas. F. Brown
Arthur O. Seldon.

INVENTOR..
William J. Brown Jr.
Chas J. Gooch
attorney.

either of these operations, push the staple out and through the material. The springs S will then rebound and draw the hammer-blade C back within the cylinder A, when the projecting points of the staple may be pressed down flat against the material by direct pressure thereon of the side of the tube, or of any other part of the device, or they may be flattened in any other desired or convenient manner.

Having thus described my invention, what I claim, and desire to secure by letters patent, is—

219 1. The combination of the tube or handle A, spiral spring S, slotted disk E, sliding inner tube, B, and hammer-blade C, having shoulders *d d*, substantially as and for the purpose set forth.

2. The vertically-slotted tube B, of cylindrical form at its upper portion, to adapt it to fit and slide within the cylinder A, and flat or tapering at its lower portion to secure the ready insertion of the staple within the slot and its straight insertion in the material to be fastened, substantially as specified.

3. The hammer-blade C, having shoulders *d d*, adapted, on the upward movement of said blade by the action of the spiral spring S, to impinge on the projecting corners of the inner surface of the tube B, as and for the purpose set forth.

4. The disk E, slotted to receive the hammer-blade C, and arranged on the top of the tube B, to serve as a guide and stiffener to said blade and a support for the spiral spring, substantially as set forth.

In testimony that I claim the above as my invention I hereunto set my hand this 26th day of April, A. D. 1879.

WILLIAM J. BROWN, JR.

Witnesses:
C. W. SYKES.
G. W. FOGEL.

(Here follows diagram marked p. 220.)

221 UNITED STATES PATENT OFFICE.

WILLIAM J. BROWN, JR., of Philadelphia, Pennsylvania, assignor to Annie J. Brown, of same place.

Device for Inserting and Clinching Metallic Staples.

Specification forming part of Letters Patent No. 260,365, dated July 4, 1882. Application filed January 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, William J. Brown, Jr., of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful improvements in devices for inserting and clinching metallic staples, of which the following is a specification.

The object of my invention is to provide a suitable means for inserting and clinching the points of metallic staples when used to bind books, papers, &c., and when driven by a detachable staple-

driver, or with one which may sometimes be used separately from any other device for the simple insertion of staples without clinching; and it consists of a clinching-anvil provided with a suitable guide arm containing a guideway to direct the end or mouth of a staple-driver to a proper position, so that when a staple is driven thereby the points will be directed toward the inclined surfaces of the clinching-anvil and be turned inward toward each other upon the under side of the work, as will be better understood by reference to the drawings accompanying this specification, in which—

Figure 1 is a side view of the base and guide, with sheets upon the former and the staple-driver above them. Fig. 2 is a front view, partly in section, showing the driver and clincher or anvil in the act of securing the sheets together. Fig. 3 is a plan view of the anvil. Fig. 4 is a plan view of the guide and clincher or anvil.

By reference to Figs. 1 and 2 it will be seen that the stand or base B is provided with a raised anvil, *b*, at its front end, and in the top face of this anvil is a recess or depression, *b'*, which is shallow or dish-shaped, as shown. The inclined sides 2 2 of this depression, coming in contact with the protruding points of a staple as it is pushed down upon them, operate to turn said points inward toward each other, as indicated in Fig. 2.

To the rear end of the base B is attached a metal blade or arm, A, which projects horizontally forward over the clinching cavity *b'* of the anvil. This arm A is provided at its forward end with a guideway, *a a*, for receiving and guiding the mouth of a staple-driving punch directly over the clinching-cavity. These guideways *a a* may be formed in various ways. In Fig. 4 a circular orifice is formed in the end of the guide-arm A, in which the staple-driver may stand in various positions, as indicated by the dotted lines in said figure, and in which any two opposite points within the circle may form the guideways *a a*.

It is now obvious that if papers to be bound or other material to be fastened be placed upon the anvil, over the clinching-cavity *b'*, as at C, Figs. 1 and 2, and the mouth of a detached staple-driver be introduced within the guideways *a a*, so that its open end is resting on the work C, and if a staple be driven from it downward through the work, the ends of the staple will, upon protruding through the under side of the work, impinge on the slanting sides 2 2 of the clinching-cavity, and be thereby directed inward toward each other, and thus become clinched, in the manner as shown in Fig. 2.

Having thus described my invention, what I claim as new therein is—

As an improvement in devices for inserting and clinching metallic staples with detachable staple-drivers, a base provided with a clinching-cavity, combined with an arm extended over said cavity and having above the latter a guideway for receiving and guiding the mouth of the staple-driver to position over the clinching-cavity.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. BROWN, JR.

Witnesses:

STANISLAUS REMAK,
ADOLPH EICHHOLZ.

222 *Complainant's Proof in Rebuttal.*

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sess., 1883.

ISAAC W. HEYSINGER *et al.*
vs.
JAMES P. CRAWFORD. } No. 40.

Proofs in rebuttal taken on behalf of the complainant before Francis S. Brown, examiner, at the offices of Hector T. Fenton, Esq., respondent's solicitor, No. 905 Walnut street, Philadelphia, pursuant to notice.

WEDNESDAY, *October* 3, 1883.

Present: Joshua Pusey, Esq., solicitor for complainant; H. T. Fenton, Esq., solicitor for respondent.

ISAAC W. HEYSINGER, a witness called in rebuttal on behalf of the complainant, having been previously sworn and examined by Mr. PUSEY, says:

Q. 1. As the main object of the questions which I shall proceed to ask you will be to aid the court in arriving at a conclusion in this cause through the assistance of a clear explanation of the
223 construction and operation shown and described in the several letters patent put in evidence by the defendant, and at the same time a comparative analysis thereof with the invention described in the Heyl reissue No. 9803, I desire you to first state the nature and extent of your knowledge and experience, first generally, and then specially, with reference to the class of machines under consideration, so that the court may be enabled to judge as to your qualifications as an expert witness in this cause.

A. 1. I have been engaged in mechanical pursuits for many years. I have invented and patented a large number of tools and machines, and for the past eight or ten years have conducted all my own cases through the Patent Office, including interferences and appeals, and usually with success. I have in this way and from general knowledge and practice elsewhere become reasonably well acquainted with differences and equivalences in construction and adaptation of mechanism and parts thereof. I have for the past six years been engaged as the directing person for the most part of a manufacturing concern engaged in bringing out new articles and specialties of various kinds, and have acquired considerable practical knowledge in designing, inventing, reducing to practice, and perfecting for the trade numbers of articles which have been successfully and largely introduced both here and abroad. Among these articles are certain machines for fastening papers together by metallic staples. We have made and sold these articles under the name of the Philadelphia Novelty Manufacturing Company by virtue of certain patents which I have taken out myself or the firm has acquired both in this country and Great Britain. Among the patents secured by me are my patent of April 13, 1880; British patent of April 14, 1880; Brit-

ish patent of 1882; United States patent of April, 1883; and of those acquired by the firm the Betts patent of 1866; the Heyl patent of September 25, 1877, and its reissue of July 12, 1881. After we began the manufacture of these goods in the spring of 1880 suit was brought against us in Great Britain by the representatives of
224 the British patent of Geo. W. McGill of February, 1879. These suits involved us in large expense, and in order to defeat the said British patent I was obliged to fully investigate the state of the art in reference to such machines. These investigations extended over nearly two years, and caused a careful examination to be made by me of every British, French, and United States patent granted for such tool or tools which could be adapted for such purposes since the year 1840 up to the year 1879, inclusive. Since then I have kept up my knowledge of more recent patents in view of our manufacturing a similar line of goods. I, therefore, consider that I am able to speak with some positiveness of devices belonging to this branch of mechanics.

Q. 2. Before proceeding with the comparative analysis alluded to in my previous question, please explain what you understand the Heyl invention, as described and shown in the reissue patent No. 9803?

A. 2. I understand it to consist of a tool or device of a portable character, constructed and adapted to be used in the manner of an ordinary hand stamp on desks or tables in offices or private families, for stapling together with metallic staples and clinching the same in papers or like materials, instead of fastening the same with eyelets, ribbons, tapes, stitches, pins, or hand-inserted metallic fasteners, as was previously done when such work was required, the said device consisting of a light, portable frame or stand with a flat base, adapted to stand on a desk or table, having two opposite jaws capable of opening and closing on each other and clamping between them automatically the papers to be fastened together while the staple is driven through them, and the ends of the legs thereof simultaneously bent towards each other in a bending recess, one of said jaws being provided with mechanism for holding a metallic staple in a staple case, constructed to allow only longitudinal without lateral motion of said staple, which staples are inserted snugly by hand in said case, crown foremost, at the open end of said staple case and afterwards ejected therefrom (fitted to and working
225 to and fro in said staple case, but not removed therefrom during the working of the machine), when the jaws of the machine are forcibly drawn together by a blow of the hand upon the knob, such as the knobs used on hand stamps, thus projecting the staple legs through the material to be stapled, the protruding ends being turned toward each other simultaneously as they enter a concave bending recess in the opposite jaw. When the staple is driven and clinched the jaws are separated and the work simultaneously released, while a retracting spring withdraws the plunger with reference to the staple case so as to open the same for the reception of another staple, which is then inserted, crown foremost, at the open

end of the staple case by hand, either long or short, in the legs to suit the thickness or bulk of the material next to be stapled.

Q. 3. Please examine the Heyl & Brehmer patent, No. 132,078, of October 8, 1872, Defendant's Exhibit No. 10, which I now hand you, and state if you find therein the invention described in the Heyl reissue, or a different invention, as the case may be, and your reasons therefor.

A. 3. I do not find the same invention in the letters patent. They are different inventions by the same inventor. Neither is adapted to do the work of the other without extensive modification, which would require considerable inventive skill to accomplish. This Heyl & Brehmer patent is for making pasteboard boxes. The driving mechanism, except in its details, was used in the Moore patent of 1852 and other patents long antecedent to this patent. The specific devices for driving staples in this, in addition to the plunger and staple case, which are requisite in all similar machines in their very nature, consists of a powerful spring to forcibly drive down the plunger, which is retracted by a cam lever, exactly the reverse of the Heyl reissue, in which the hand and arm acting as a powerful lever drive the staple, the retraction being accomplished by a light spring. The feeding is not done between opposite jaws like the Heyl reissue; the staples are not so inserted, but are inserted in the staple case at the open end thereof, but are made from a reel of wire
226 in the body of the machine by coacting mechanism forming a part of the machine, fed from behind; without any coacting mechanism the machine could not be successfully used. The clinching, also, is accomplished by swinging lugs, requiring a whole train of additional mechanism, without which the machine would not work. No parts of the machine could be detached and made to operate like the Heyl reissue without the exercise of invention. The Heyl & Brehmer machine is a power machine; could not be operated by hand; cost many hundreds of dollars to produce, and is only for use in factories, and, to my knowledge, have not been used elsewhere.

Q. 4. Examine the letters patent of H. R. Heyl, No. 175,457, of March 28, 1876, Defendant's Exhibit No. 11, which I now hand you, and answer with regard to that patent as I have asked with regard to Exhibit No. 10 in question 3.

A. 4. This invention, as described in the specification, is merely a modification of the Heyl & Brehmer invention adapted to boxes of certain peculiar shapes for which the previous patent was not adapted. The specification describes it as consisting of a few improvements in the mechanism of the former patent. The forming, driving, and clinching of the staples are substantially the same in the two patents, as well as the design, operation, and general construction of the machine.

Q. 5. Look at patent of H. R. Heyl, No. 183,670, dated October 24, 1876, Defendant's Exhibit No. 12, and answer as to that patent as if responsive to the previous question.

A. 5. All that has been said by me regarding the essential differences of the Heyl & Brehmer and the Heyl patent of 1876, compared

with the Heyl reissue, are true of this, with the additional difference that mechanical awls rotating at a high rate of speed bore holes in the book, as this is adapted for the manufacture of bound or stitched books, so that no impulse or shock is necessary to insert the staples, which pass through the prepared holes and are bent up by lugs moving up from the side after the staple is driven and not simultaneously therewith by impingement against a concave bending
227 recess solid with the clinchers. It is true that these lugs are so arranged as to slightly converge the ends of the staples in some cases before they move up to clinch it; but this bending or converging is not analogous to that of the Heyl reissue, because it would be impossible to remove the book when the legs are thus converged slightly to flatten the same afterwards between flat surfaces without taking the machine apart, even if desirable to do so. In that case a portion of the mechanism would be thrown out of use and the machine fail to accomplish its purpose, as the book is carried forward to make the series of stitches automatically by rollers stopping at various points, so the machinery is arranged and described as operating.

Q. 6. I ask a similar question to the foregoing with reference to the Heyl & Brehmer patent, No. 191,426, of May 29, 1877, Defendant's Exhibit No. 13, which I hand you.

A. 6. This is a machine for stitching large books to tapes passing across the back through the signatures of the various folios. There is no essential difference between this and the previous machines. The staples are made from the reel, carried away under the driver, high up in the case, carried down, driven through the signature and the tape behind it, and clinched by lugs operated mechanically, which approach each other, and turn the legs flat against the tape. There are countersinks where the staple passes into the clinching mechanism, but these are to prevent the ends of the staples from striking against the body of the bed-plate and crushing them up. The head-block and clinching-bed are adjustable with reference to each other, but not automatically as in the Heyl reissue, by the mere act of bringing the parts into position to drive the staple.

Q. 7. Going back to your answer to my second interrogatory, do you find an implement, such as you have described, described and shown in the Heyl reissue?

A. 7. I do.

Q. 8. Are Plaintiff's Exhibits B and C and D constructed in accordance with the specification of said reissue?

228 A. 8. They are.

Q. 9. Do you find that the essential features of the machine are claimed in the original Heyl patent and reissue?

A. 9. I do; except that in the original patent the principal claim was inoperative—I mean the fourth claim of the original—by reason of the element of the combination necessary to make it operative; I mean the sliding staple guide was omitted.

Q. 10. Are you familiar with the J. C. Smyth patent of February 6, 1877, Defendant's Exhibit No. 14, and with the Smyth machine? If so, please point out wherein that machine differs, if at all, from

the Heyl machine as described and shown in his reissue, and also as explained by you in your answer to my second interrogatory.

A. 10. I am familiar with the Smyth machine and the patent referred to, that of J. C. Smyth. I can say this machine to be entirely different from that of the Heyl reissue, in construction and operation, and to be for a different purpose. It is not in any sense adapted in practice for the uses of the Heyl tool. In the first place, as shown in the drawing, and illustrated in the model, in the Patent Office at Washington, which I have examined, and in the very nature of the machine itself, it is not adapted for use as a hand tool upon desks or tables, or in offices where the tool is to be used for miscellaneous purposes and moved about from place to place as required. It will not stand upon a table without first cutting a hole in the table to admit the passage of the adjusting screw, without which the die plate *m* cannot be raised or lowered, except the constant elevation and lowering given by the sliding wedge plate *s*, which is the same in all cases. If the material to be next stapled be thicker than the last the wedge plate *s* cannot be drawn backward at all without lowering the screw to give room; while, if it be thinner than the last, the space left will allow the staple, when projected, to travel through the space below the head block, and above the material unsupported, and it will bulge out and buckle at the sides, and
229 will not penetrate resisting material much more than if driven by a hammer, which, with light wire staples, is not possible. In miscellaneous work, then, the thumb-screw *t* must be constantly resorted to, and access must be provided through a hole in the table, as shown in the drawing. The machine must also be firmly screwed down to the table, as otherwise the raising of the rear end of the lever, which is said to draw back the wedge plate *s* and compress the material between the die *m* and the head block, and also drive the staple through the mass of material, will throw the machine off the table without doing the work desired. This lifting also of the rear end of the lever h^1 to do the work will prevent the machine from being set over the front edge of the table instead of making a hole in the same for a screw. Then the method of supplying the staples is by feeding them from a sloping table down a chute on to a bar, down which they slide astride of the same, dropping into the staple channel, each one being held by a spring, *k*, therein until the descending plunger forces the spring back and carries the staple down. It is obvious that this machine operating in this way will feed staples of the same length of legs for material of various thicknesses requiring longer or shorter staples, and this is a further reason for being convinced that the machine was never intended to be used for miscellaneous work on constantly varying thicknesses of material. Staples cannot be inserted from beneath on this machine, as I have tried on the model, unless the machine have the thumb screw *t* turned back as far as it will go, and not even then except with difficulty, if at all, without a tool of some kind, while the thumb screw in such case will practically have to be removed and reinserted every time. A trial will show, even with the Heyl tool, that it is not easy to insert

a staple at the open end by hand if the staple case be held downwards so that the open end is invisible and all the manipulation be done by the sense of feeling, even if no obstacle be interposed beneath, which is not the case in the Smyth tool. I have calculated that it would take more than three times as long to put
230 staples into paper and clinch them by the Smyth tool operated in that way as to do the same by boring holes in the paper by an awl, inserting the staples by hand, and bending the legs down with a knife blade—that is, it is not practicable in my opinion. Then there is no way by which the machine can be graduated to the thickness of the work to be stapled before it is tried on a similar bulk or the same bulk. One may know the lift of the wedge plate *s*, but what exact elevation does the thumb screw *t* now stand at, and what compression of the paper will be required, some paper compressing more than others? As the rear of the lever h^1 must be lifted to work the whole machine it is the most awkward direction it could have and the most inefficient in operation if it is to be struck up by the hand to drive down a staple and all for no ascertainable object if it is to be operated by hand, while if it is to be operated by a treadle the machine, as shown, lacks operative parts, both in the drawing, specification, and model; and the addition of these would make it a foot-power machine and remove it still further from the Heyl, which is only described and claimed as a hand tool. The Smyth machine, however, to be operated by having the staple driven down by a blow of the plunger, this must have a knob, and, if so, the link which connects the plunger with the lever h^1 must be done away with or the blow will fall upon the link; but if the link be done away with the lever h^1 cannot be raised by the perpendicular ascent of the plunger and the arm h^2 and its link and wedge plate will remain at rest and will not operate the die plate *m* and bring it up to compress the material against the head block, and the staple will be driven through an open space before it reaches the material and bulged, the slanting and bulging ends displacing and defacing the paper beneath, which can only be prevented from falling out by being held by the hand. In addition to this, it would be impossible, without great loss of power, if at all, to drive the staple by a blow on the head of the plunger, while the secondary but simultaneous operations of operating the links and levers, drawing the wedge plate *s*
231 along its bed, raising the die *m* and compressing the papers had all to be done by a sudden blow transmitted along the line of the outside connections shown in the drawing and described in the specification. Moreover, the drawing does not clearly show or the specification describe how the vertical motion of the rear end of the lever h^1 can operate the wedge plate *m* endwise or in any way, except to vibrate its rear end up and down, nor operate the machine as a whole. There is also no retracting spring shown in the Smyth machine. If it be a treadle machine none is needed any more than in a sewing-machine, but if it operate by a blow of the hand or an impulse of the hand on a lever the retracting spring to bring up the plunger will save one motion of the hand and allow

the same to occupy itself with inserting a fresh staple, thus expediting the operation of the machine, as no staple could be inserted at the open end of the staple case unless the plunger were retracted. The elements common to the Smyth and Heyl machines are simply means of forcing out a staple from a case by a contained plunger and bending the legs against a concave recess. These elements are old, and were shown in United States patents granted from time to time during the past twenty years, and before, as well as British patents. No claim is made in the Heyl patent, as I understand it, for any such combination, except as adapted by him for uses in the general combination described. The Smyth machine is evidently constructed and adapted only for use in book-binderies and printing offices, and to be run by foot or power for stapling considerable editions of almanacs, catalogues, and other similar pamphlets, as they come from the hands of the book-folders and could not be used, as the Heyl tool is constructed and adapted to be used without altering it by the removal and substitution of parts of such character as to totally unfit it for use for the purposes for which it has always been used, and for which alone it is constructed and adapted, according to the construction of the patent. While the same is true of the Heyl tool and its possibilities of being modified to do
232 the work in the way the Smyth tool is constructed and adapted to operate, such alterations and modifications in either case, in my opinion, would require the exercise of inventive skill.

Q. 11. The defendant's expert, Mr. Brown, in answer to question No. 39, stated in effect that if the Heyl machine, figure 5, were inverted the spring D would not be necessary; please state your views as to this point.

A. 11. I think it would be necessary, as otherwise the force required to push the staple into the staple case would push back the case and cause the ends to be thrust against the thumb by the crown of the staple impinging against the driver.

Q. 12. Are you familiar with the Esser and Steare patent, Defendant's Exhibit No. 8, and the H. C. Bradford patent, Exhibit No. 9; if so, wherein do they respectively differ from the Heyl machine?

A. 12. I am familiar with these patents. They are for setting buttons fast to cloth or leather by means of pronged staples. Neither of these patents have a staple case to hold the staple nor a contained plunger. One is a hand tool; the other a power tool. The legs of the three-pronged staple, which is the kind used, are driven first into a block with three holes corresponding thereto to give them easy passage; the block is then turned to expose a concave bending face to bring the legs together and then turned again to flatten their legs completely against a flat surface. The absence of staple case and plunger put these machines into a different category entirely, as they cannot be used for any such work as the Heyl, Smyth, Heyl & Brehmer, or any tools which I have before spoken of in my previous answers.

Cross-examined by Mr. FENTON:

X Q. 13. What are the opposite jaws of the reissued patent as you find them in the "Victor" tool?

A. 13. The metal of the staple case through which the plunger rises and falls, and which is in contact with one side
233 of the paper, and compresses the same against the recessed clinching base, forms the two jaws, just as they do in the Heyl reissue, where the same parts act in the same way. Should, however, the staple-drive guiding slot, in the overhanging arm of the Heyl tool be capable of being brought down against the paper, and should the metal of the staple case be too large to pass entirely through this slot, it would then bring the arm down with it, and whichever of the two made the contact would constitute one of the jaws, both, however, operating together by the pressure of the hand in driving.

X Q. 14. Then you do not think that the clinching base and the rigid guide arm of the "Victor" tool constitute and are the equivalents of the two opposite jaws mentioned in the reissued patent?

A. 14. Yes; the two co-operate—that is, the guide arm, whether movable or rigid, and the driving mechanism, whether ordinarily detached from the other parts of the machine or not, together constitute one of the jaws, for this reason: The opposite jaws guide the driven staple out of one of the jaws into the clinching recess in the other; without this no opposition could be secured with certainty and the staple would fail to reach the recess at all; besides this, if it were enabled to reach the recess with the greatest accuracy and no means were provided for driving a staple into the recess, the tool would be equally useless. Hence, I consider that these parts must co-operate to make one of the jaws when the tool is in use. No staple, however, could be inserted in the staple case, if the arm was rigid, the staple case firmly attached thereto with its plunger fixed therein, if the intervening space between the jaws was not greater than the distance through which the staple could be driven with ordinary material, or through which it would be possible for the staple to pass without support where the thickness of the material is less than the fixed space between the rigid jaws.

X Q. 15. Then you consider the clinching base and staple case and the guide all to be essential elements in this machine,
234 without which it could not be successfully operated with certainty; is that so?

A. 15. There must be two opposite jaws, one containing a clinching recess, the other mechanism for driving a staple. The material to be stapled lies between the staple case and the clinching recess.

X Q. 16. If an apparatus was constructed as shown in the Heyl patent, whether the clinching base be the top or bottom jaw, and the plunger was operated by means of a lever, as in a hand seal stamp, would you say that it was a device included within the claims of that patent or any of them?

A. 16. I certainly do, if the one was used as the equivalent of the other in a portable device of this general character. The question

of equivalents in the Smyth tool lever depended upon the action of the coacting parts as well.

X Q. 17. In answer to Q. 9 you said that "the principal claim is inoperative—I mean the fourth claim of the original"—by omitting from the combination "the sliding staple guide." What part do you mean by that?

A. 17. C C, which form with B the sliding staple guide, C C being the grooves in the said staple guide B.

X Q. 18. Do you find any other claims of the original, in your opinion, inoperative?

A. 18. In my judgment the first and second claims could not have been sustained, and I doubt whether they were patentable originally. The third claim is incorporated in the reissue and covers a very subordinate feature, merely the open slot, by means of which the tool is adapted to receive in its staple case a staple with a loop projecting from the crown thereof, or what is known as a suspension-ring staple, the fourth claim relating to the invention.

X Q. 19. Did you find any defect in the original patent other than that, in your opinion, the claims or some of them were not sufficiently broad or failed to include in one or more of them an element to make it or them an operative combination?

235 A. 19. The first three claims of the original were entirely outside of the statement of invention in the specification, which reads, "My invention consists of an implement in the form of a hand stamp, by which metallic staples may be forced through sheets of paper documents, and secured by clinching the legs on the reverse side." The form of a hand stamp marked the general adaptation and construction of the parts, while the sheets of paper documents marked the miscellaneous character of the work for which it was adapted, in contradistinction to previous tools made for use on edition of pamphlets. In the fourth claim the reciprocating slotted or recessed hammer marked the compressing jaws, acting automatically, to hold the paper while the staple was driven, and the projecting ends simultaneously bent over. These, with the drawings, clearly marked the tool, and I should have had no hesitation in bringing suit on this patent, had I owned it, on the fourth claim alone of the original were it not for the omission of the element omitted, to wit, the sliding staple guide B.

X Q. 20. My question was to inquire not into the validity and comprehensiveness of the claims of the original patent, but whether you found any defect in the descriptive parts of the specification of that patent to describe fully and clearly the construction and operation in all its essential features to any one skilled in the art to which it appertains?

A. 20. I did not. The parts left out in the reissue do not belong essentially to the invention, and no change has been made involving substance. A skilled mechanic would make the same tool and no other from either or both of the specifications and drawings.

X Q. 21. Then, if I understand you correctly, the descriptive parts of the specification of the original were full, clear, and per-

fect, but the defect, in your opinion, if any there was, resided in the claims only; is that so?

A. 21. In its essence or substance, yes.

X Q. 22. The description was not amended, was it; I mean, of course, apart from the mere words?

236 (Question objected to, as full answer thereto is to be found on comparison of the respective patents.)

A. 22. The inventor could not swear on application for reissue, as he did in his original application, that he had invented that part relating to a second blow, when he had learned in the intervening time that the same had been used before his invention thereof. This part was therefore disclaimed. The reference made in the specification to one of the antecedent patents and the body of the specification was changed to conform to this discovery. This, however, did not affect the substance of the invention, as given in the statement of invention and description, drawing, and third and fourth claims of the original.

X Q. 23. Do you not know that this second blow operation formed no part of the claims of either the original or the reissue patent?

A. 23. I am satisfied that in view of the state of the art neither of the first two claims could have been sustained. The Esser & Steere, the Palmer, and the Bradford patent all showed the same thing. I do not understand that a claim for striking a second blow or any number of blows could be entertained by the Patent Office, as it is purely functional outside of the means for driving it, which in this case are identical.

X Q. 24. Question repeated.

A. 24. Yes; I know it didn't.

X Q. 25. You have said that the original specification in the descriptive parts was full and sufficient to enable any skilled mechanic to make the machine in all its features; that is described in both the original and reissued patents. The effective purpose, then, of the surrender and reissue was simply to enlarge the claims in the features wherein you considered them insufficient and inoperative. Is that so?

A. 25. The claims were not enlarged in substance. They are all contained in the subject-matter of the first claim of the
237 reissue. The others are specific descriptions of what is necessary and proper to make it a good tool of the kind. I do not consider the reissue broader than the original, though it is less likely to provoke controversy and produce litigation by being more clearly set forth.

X Q. 26. Did you prepare application for and obtain this reissue?

A. 26. I did; I prepared it to a great extent in Washington after personal interviews with the principal examiner, Mr. Chapman, who is known as being extremely rigid; he insisted that no alteration should be made which enlarged the scope of the original patent; he said that he clearly recognized the fact——

(Mr. Fenton here objects to the declaration of other persons.)

that the McGill patent was subordinate to the Heyl, and whatever the reissue obtained must be such, as it was clearly entitled to contain with this explanation; I say that I did secure the reissue after consultation with other skilled solicitors familiar with the case, including present counsel and the solicitor in the original application.

X Q. 27. Was this application made and filed before or after you took an interest in the patent under the exclusive license or assignment set out in the pleadings?

(This line of examination is objected to by complainants' counsel for the reason that, although it may have been proper cross-examition in the testimony-in-chief of the witness, it is not now legitimate cross-examination.)

A. 27. We had an exclusive license or royalty, but no assignment; the application was made before the license set out in the bill.

X Q. 28. In answer to Q. 10 you have said, "The elements common to the Smyth and Heyl machines are simply means of forcing out a staple from a case by a contained plunger and
238 bending the legs against a concave recess," and that no claim is made in the Heyl reissued patent for such a combination *per se*. Under this state of facts will you please tell me wherein you think the novelty of the Heyl device consists?

A. 28. It consists, in addition, first, in the automatic adjustment to various thicknesses of paper, by means of which, without any added parts, the jaws are adapted to grip and hold all thicknesses of paper while being stapled and clinched in their capacity for being opened to allow the eye to see the staple while being inserted by hand at the open end of the staple case, whereby a length of staple may be adapted or selected to suit the material in the retracting spring to keep the staple case constantly open for a new staple in a hand knob for driving down the plunger, and in the general construction and adaptation of all the parts to be used as a light, portable desk tool, low in price, simple in construction and operation, and of universal use.

Re-examined by Mr. PUSEY:

Q. 29. Referring to X Q. 15, in which "the guide" is mentioned, and to which guide you did not refer in your answer to that question, please state whether it is not required as a mechanical necessity in order that a tool of the character referred to should do its work with effectiveness and certainty that a guide should be used in order to direct the two coacting parts properly together, to wit, the clinching recess block and the staple guide.

A. 29. Some such guide must be used.

ISAAC W. HEYSINGER.

239 And afterwards, to wit, on the 29th day of October, A. D. 1883, this cause having been called for argument and the parties being ready, the same was argued by the counsel for the re-

spective parties on the pleadings and proofs; and, not being fully advised in the premises, the court takes further time to consider thereof

And afterwards, to wit, on the 2nd day of November, A. D. 1883, the court, by Hon. William Butler, judge, filed the following opinion, to wit:

HEYSINGER *et al. v.* CRAWFORD.

BUTLER, *J.:*

The validity of the patent, as respects the claims involved, was before this court in Heysinger *v.* Brown, and the patent sustained.

With the additional proofs now in we are asked to declare the invention anticipated. The machine presented as evidence of anticipation and mainly relied upon is that of J. C. Smyth, patented in February, 1877. It is worthy of remark that Mr. Brown, upon whose testimony as an expert reliance is placed to show the similarity of this machine with Heyel's, did not set it up in his own case, although he was as familiar with it then as he is now. While he realizes the importance of explaining this, the explanation furnished is not satisfactory. Mr. Heysinger, the complainants' expert, testifies that no such similarity exists, and states his reasons for this conclusion. More satisfactory evidence, however, than that of either expert is to be found in an examination of the machines themselves. When thus compared the dissimilarity is very apparent. It is true that the Smyth machine, when stripped of various parts and altered in others, bears some resemblance to Heyel's. These alterations, however, produce a new machine, evidently not discovered by Smyth. While this, even, is not Heyel's—not having its combination of anvil, sliding staple guide (working upon a spring), and reciprocating hammer, nor its consequent automatic clamping action—it is, nevertheless, so suggestive of a device greatly needed, and therefore of great value, that we cannot believe Smyth would not have perfected the machine for the purpose suggested if he had made the discovery attributed to him. Heyel, perceiving the great need of such a device—light, portable, capable of hand operation, adapted to general use for binding papers together by means of staples, and having knowledge, doubtless, of Smyth's complicated and cumbersome machine, as well as of the general state of the art—invented the device under consideration. The proofs show that it has gone into very common use and is of great value. As respects the first and second claims of the reissue—which are substantially the same as the fourth of the original—the patent is sustained. We say these claims are substantially the same as the fourth, because when the latter is read in the light of the specifications this is so. Of the other claims nothing need be said.

The question of infringement is virtually the same as in the case against Mr. Brown. The defendants' device here and there are substantially the same. Each infringes the plaintiffs' rights covered by the claims specified.

A decree must be entered accordingly.

240 And afterwards, to wit, on the 9th day of November, A. D. 1883, the court entered the following decree, to wit:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sess., 1883.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. Loren Heysinger, Trading as the Philadelphia Novelty Manufacturing Company, and George W. Heyl
vs.
JAMES P. CRAWFORD. } No. 40.

And now, this 9th day of November, A. D. 1883, this cause having come on to be heard at this October sessions of the court on pleadings and proofs, and having been argued by Joshua Pusey, Esq., counsel for complainants, and Hector T. Fenton, Esq., counsel for defendants, and the same having been duly considered by the court, it is ordered, adjudged, and decreed as follows, to wit:

That the reissue letters patent of the United States, No. 9803, dated July 12, 1881, issued to Henry R. Heyl, assignor to George W. Heyl, for improvement in devices for inserting metallic staples, are good and valid as respects the first and second claims thereof (which claims only were considered by the court).

241 That the said Henry R. Heyl was the first and original inventor of the invention therein described and claimed in the first and second claims thereof.

That the defendant, James P. Crawford, has infringed said reissue letters patent by making and selling devices for inserting metallic staples containing the invention described in said letters patent and claimed and secured in and by the first and second claims thereof.

That the complainants are the sole and exclusive owners of said reissue letters patent No. 9803, and that they are entitled to a perpetual injunction, according to the prayer of the bill, restraining the defendant, James P. Crawford, his servants, agents, and workmen, from making, using, or selling, or causing to be made, used, or sold, devices or machines embracing or using the invention described in said reissue letters patent and claimed in the first and second claims thereof.

And it is ordered that a writ of injunction issue against defendant accordingly, and that the complainants do recover of the defendant, James P. Crawford, the profits and gains made and received by him in consequence of the infringement and violation of the exclusive rights of the complainants under and by virtue of said reissue letters patent No. 9803, together with the damages the said complainants have sustained thereby and together with the costs of this cause.

242 And it is referred to Lincoln MacVeagh, Esq., as master, to compute, ascertain, and assess the said gains and profits and damages to the said complainants, and to take the proofs thereof and report the same to the court, with leave to the complainants to move the court upon notice to increase said profits, gains, and damages that may be assessed and reported by the master in accordance with law.

243 And afterwards, to wit, on the 28th day of January, A. D. 1884, the master presents his report, with the exceptions thereto, and the same is ordered to be filed in the words following, to wit:

Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity. April Sessions, 1883.

ISAAC W. HEYSINGER *et al.*
vs.
JAMES P. CRAWFORD. } No. 40.

To the honorable the judges of the said court:

The master, to whom the above matter was referred by the court by decree entered November 9th, 1883, a copy of which is hereto annexed, *respectively* reports that, after due notice of his appointment and the time and place of meeting being given, he was attended on Thursday, December 27th, 1883, and Thursday, January 3rd, 1884, by the counsel and parties in interest for the purposes of his appointment.

Present: Joshua Pusey, Esq., for complainants, and Hector T. Fenton, Esq., for respondents.

244 The defendant offers in evidence a statement taken from their books of all machines made and sold known as the "Victor drivers," and declared to be an infringement upon the Heyl reissue patent No. 9803, dated July 12th, 1881, for a device for inserting and clinching metallic staples.

Mr. Pusey, for the complainants, agrees to accept the statement in evidence as a true copy of the books of the respondent, and as showing the profits made by them in the manufacture and sale of the "Victor driver."

Meeting adjourned.

Met, pursuant to adjournment, Thursday, January 3rd, at 11 o'clock a. m.

Present: Mr. Pusey, for the complainants; Mr. Fenton, for the respondent.

Complainants examined Mr. Heysinger, one of the complainants, to show the damages they have sustained by reason of the infringement.

Mr. HEYSINGER sworn.

By Mr. PUSEY:

Q. How long has your firm been engaged, and to what ex-
245 tent, in the manufacturing of the machines under the Heyl reissued patent No. 9803?

A. Since the beginning of 1880 we have manufactured a number of tools under this reissued patent—the "Novelty paper fastener," a small tool having a staple-driver *de*tached; also a larger tool having all the parts consolidated into one, and other implements

for binding papers. We began the manufacturing of these machines early in 1880. At that time there was no tool in competition with the "Novelty paper fastener," which sold at a low price and used low-priced staples for stapling and clinching papers, etc. We expended a great deal of money in building up the selling of these tools, which found a ready and extensive sale.

During 1880 we sold between three and four gross of these goods. During the latter part of 1880 an imitation was brought out, but did not appear to give satisfaction. Suit was brought, however, on a patent granted subsequently to the "Heyl," but a verdict was not obtained. In the spring of 1881 application was made for a reissue of the Heyl patent, which was granted July 12th, 1881. Suit
246 was brought under this patent against W. J. Brown, Jr., and in November, 1882, an injunction was granted against the infringers. During 1881 our sales continued very large—a total of about three hundred gross. Immediately after the injunction against Mr. Browne his business was transferred to Mr. Crawford. (Objected to by Mr. Fenton; objection allowed.) The tool appeared, being sold by Mr. Crawford, against whom another suit was brought and an injunction granted during last November. The damage inflicted upon our trade by the Victor tool was greater than by any other tool previously put upon the market, for the reason that it more nearly resembled the Novelty tool in form and appearance and in the method of putting it up in boxes together with envelopes and staples of various lengths for various thicknesses of paper, substantially adapted to fit the "Novelty driver" as well as the Victor tool, and by reason of its being supplied with suspension rings for hanging up show-cards, etc. (Objected to by Mr. Fenton; objec-
247 tion allowed). And also because whole it cost more to make, by reason of the more elaborate style of staple-driver used; it was sold, we were informed by our customers, at a lower price than the "Novelty fastener," and, as we believed, at a much smaller profit than any business transaction would justify, unless for the purpose of taking the trade which we had established. (Objected to by Mr. Fenton; objection allowed.) And also because the advertisements in printed publications described the Victor tool in conspicuous letters as being the only authorized one, leaving it to be inferred that the "Novelty paper fastener" was an infringement. (Objected to by Mr. Fenton; objection allowed).

Complainants offer in evidence a copy of a paper called "The Printing and Stationery Word," of November, 1883, containing the advertisement referred to.

Q. You advertised your tools very extensively, did you not?

A. We have expended thousands of dollars advertising them.

Q. Please state the cost of manufacturing your staple-
248 driver—that is, those made by you since the date of the Heyl reissue.

A. The net cost of the driver, clincher, box, and staples would be about twelve and a half cents each, not varying one-half a cent either way. The net cost includes everything.

Q. What was your selling price?

A. Fifty cents each, less one-third, making thirty-three and one-third cents, and to the large jobbing trade ten per cent. additional discount, making thirty cents apiece net. This refers to the "Novelty paper fastener," a tool of the same style and kind as the Victor tool and put up in the same way.

Q. Please state whether or not there was any tool in the market, or is now, adapted to take the place of the "Novelty fastener"—that is, performing the same functions.

A. Yes; there is the McGill tool.

Q. What is the price of that tool?

A. One dollar each.

Q. Please state whether or not you know positively that you have lost the sales of your fasteners by reason of the Victor drivers being offered for sale by the respondent.

249 A. I have been so informed by our customers and our general agents. R. Watson and Company, New York, stated that the trade had been very greatly interfered with by the Crawford tool, and unless we could stop the infringement it would stop our business.

Q. State whether or not the McGill tool interferes with your sales of the "Novelty fastener," and the reason for your answer.

A. To a very small extent in comparison with the Crawford tool, for the reason that the McGill tool is made to drive a special staple, which sells from three to eight times higher than the Novelty staples and cannot be used with the Novelty tools; also because the McGill tool sells at from double to five times the price of the Novelty tool and furnishes no staples with the tools as sold; also because the tools are much larger and heavier and are used in connection with McGill's patent fasteners. We have brought suit against this as an infringement.

Q. State, if you can, the number of Novelty drivers made by your concern since the date of the reissue of the Heyl patent.

250 A. About 390 gross.

Cross-examination by Mr. FENTON:

Q. At what prices do you sell your Novelty tools to Watson and Co., of New York?

A. We get $30.60 a gross. He pays all the expenses of the advertisements, of the travelling salesman, etc.

Q. Watson and Co. are your agents for the distribution of the tools throughout the United States, are they not?

A. Yes; to the stationery trade.

Q. You do not sell any goods except through them, do you?

A. We sell very largely to other parties. We sell to exporters and commission agents all through the country. Watson and Co. are only our agents to sell to the New York stationery trade, and by means of travelling salesmen to the stationery trade throughout the United States. All the Canadian and export and commission trade is sold directly by us at higher prices. Our export price is $38.00 per gross "spot" cash.

251 Q. How long have the Watsons been your exclusive agents for the stationery trade in the United States?

A. We have always sold directly in Philadelphia when the orders come to us until within three or four months.

Q. You make what is called the Heyl tool, do you not?

A. We make a desk tool having the parts consolidated.

Mr. Fenton claims that the tool known as the novelty tool is not the device of the first and second claims of the reissued patent, and therefore ought not to be used as a standard of comparison in this matter.

Q. You make the "original fastener" under the Heyl patent, do you not?

A. Yes.

Q. What does it cost you to make this tool?

A. I judge about forty or fifty cents.

Q. What proportion of these do you make to the Novelty tool?

A. A small proportion to the "original"—the cost is against it.

Q. Under your contract how much royalty have you paid to Heyl?

252 A. We have paid the minimum figure of $200.00 per year in addition to the cost of litigation.

Q. The royalty is so much upon the "original" tool, is it not, upon the fastener?

A. The Novelty fastener was made previous to the date of the reissue and was excepted in consideration of other expenses incurred and to be incurred by us. We pay royalty on all the Heyl tools except the Novelty fastener.

Q. The proportion of the Novelty fasterners made by you to the other tools in the past two years is very large, is it not?

A. It's twenty to one in the number of tools. The "original" tool has been made only recently.

Q. What's the expense of selling these Novelty tools?

A. The cost of selling is included in the cost of manufacture. Mr. Watson pays all his own expenses and the cost on the few goods we have sold is very small.

Q. What are the items which make up the twelve and a half cents of production?

A. One and a half cents for box, two cents for staples, four and a half cents for driver, two cents for clincher, one-half cent for
253 spring, and the balance for shop rent and expense of getting the goods up.

Q. What is the item of labor?

A. That has been included in the prices given for the different items.

Q. Does this include salaries?

A. Yes; this includes everything.

Q. Are you willing to swear that you have made an absolute net profit over and above all charges of every kind properly to be considered as items of expense in the business of making and selling these tools of eighteen cents apiece on every one you have sold?

A. I consider that we have made a clear net profit of fifteen dollars per gross on all the "Novelty fasteners" which we have sold.

Q. Could you have gotten any more money in the market for the Novelty tool with a spring in it?

A. I think not. (The witness explains that no trouble had arisen from the want of a spring and that it would have cost more, and therefore the price would have been higher.)

Complainants call Mr. CHRISTIAN H. HERSHEY, one of the
254 complainants, — sworn.

By Mr. PUSEY:

Q. What part of the business of the complainants do you attend to?

A. I have charge of the office and details of the manufacture of the goods, and also of the selling of them.

Q. You have an accurate knowledge, I infer, of the cost of the manufacture of the tools made by your firm, and of their selling prices?

A. I have.

Q. What profit, if any, have you made per gross upon the "Novelty fasteners?"

A. Our profits on the "Novelty paper fasteners" have been fifteen dollars per gross, as near as I can settle.

Q. What average profit, if any, have you made on the original tool?

A. About $30.00 per gross.

Q. How long have you been making for the market the original tool?

A. About a year and a half; a very few were made and sold the first half year.

Q. Please state as to whether or not, in your opinion, and give your reasons therefor, the "Victor staple-driver" of the re-
255 spondent interfered with the sale of the tools made by you.

A. I discovered immediately after the introduction of the Victor tool that our trade on paper fasteners was falling off; I also discovered that our customers were buying and having on hand a Crawford or Victor tool, and in one instance I found that our tools were set aside and the sale of the Victor encouraged; John Wanamaker's buyer, on whom I called to make sales of our fasteners, said that he could buy the Brown or Victor tool on better conditions; I made a certain discount on our tools, which were the best terms we then made to the trade; he said he was buying on better conditions, and said he would set aside our tool and sell the Victor; I also called some time since at Mr. Bushnell's store, Fourth St. below Chestnut, and there saw both the Victor and our tool in the show-case; I asked one of the salesmen who didn't know me which tool they sold the most of; he said the Victor; I asked him why it was; he replied that they liked the driver only, which makes up the combination better than ours, which sold better.

256 Q. Please state whether or not you were obliged by the competition of the Victor tool to lower your prices for the Novelty tool.

A. I do not now recollect.

Cross-examination by Mr. FENTON:

Q. What did you mean by saying that the Victor interferes with the sale of your tools?

A. I mean that it interfered with the Novelty fastener, and as to the "original" I cannot say, because we have not put the "original" on the market to any extent until lately.

Complainants finish.

Respondent calls Mr. WILLIAM J. BROWN, Jr., — affirmed.

By Mr. FENTON:

Q. Please state your connection with the business and what you know of the prices of the "Novelty paper fasteners."

A. I have been general manager for Mr. Crawford. Our sales have been almost entirely to the stationers. The Novelty tool
257 has been offered generally. I was shown the figures on the price book of the American News Company of New York, and my recollection of those figures is that they were $36.00 per gross; and in the endeavor to sell the Victor tool at our prices, which were $43.20 per gross, I was met with the statement that they were buying the Novelty tool in various places at $39.00 per gross and under, that being represented to be the asking price of the Novelty Company's representatives.

Q. Would the addition of a spring in the Victor driver make any difference in the market price?

A. No, sir.

The complainant- waives cross-examination.

Respondent closes.

258 *Decree.*

Apr. Sess., 1883. In Equity.

ISAAC W. HEYSINGER *et al.* *vs.* JAMES P. CRAWFORD. } No. 40.

And now, November 9th, 1883, this cause having come on to be heard at this term of the court on pleadings and proofs, and having been argued by Joshua Pusey, Esq., counsel for complainants, and Hetor T. Fenton, Esq., for defendant, and the same having been duly considered by the court, it is ordered, adjudged, and decreed as follows:

That the reissue letters patent of the United States No. 9803, dated July 1st, 1881, issued to Henry R. Heyl, assignor to George W. Heyl, for improvements in devices for inserting metallic staples, are good

and valid as respects the first and second claims thereof (which claims only were considered by the court); that the said Henry R. Heyl was the first and original inventor of the invention therein described and claimed in the first and second claims thereof.

259 That the defendant, James P. Crawford, has infringed said reissue letters patent by making and selling devices for inserting metallic staples containing the invention described in said letters patent and claimed and secured in and by the first and second claims thereof.

That the complainants are the sole and exclusive owners of said reissue letters patent No. 9803, and that they are entitled to a perpetual injunction, according to the prayer of the bill, restraining the defendant, James P. Crawford, his servants, agents, and workmen, from making, using, or selling, or causing to be made, used, or sold, devices or machines embracing or using the invention described in said reissue letters patent and claimed in the first and second claims thereof, and it is ordered that a writ of injunction issue against the said defendant accordingly.

And that the complainants do recover of the defendant, James P. Crawford, the profit and gains made and received by him in consequence of the infringement and violation of the exclusive

260 rights of the complainants under and by virtue of said reissue patent No. 9803, together with the damages the said complainants have sustained thereby and together with the costs of the cause.

And the matter is referred to Lincoln MacVeagh, as master, to compute, ascertain, and assess the said gains and profits and damages to the said complainants, and to take the proof thereof and report the same to the court, with leave to the complainants to move the court upon notice to increase said profits, gains, and damages that may be assessed and reported by the master, in accordance with law.

261 The counsel then submitted the following points for the ruling of the master:

I. Mr. Pusey, for the complainants, offers to prove that the respondent in this cause, James P. Crawford, manufacturers, in addition to the "Victor driver," a machine known as the "Philadelphia stitcher," and claims that the machine is also an infringement upon the Heyl reissued patent No. 9803, and asks that the master pass upon this point and assess the damages therefor.

The master declined to entertain this offer, holding that his power, by virtue of his appointment, extended only to the assessment of damages and not to the fact of the infringement of the patent.

II. Mr. Pusey, for the complainants, offers as a basis for the assessment of damages and as a standard of comparison a tool known as the "Novelty paper fastener," which complainants claim to be a machine manufactured by virtue of the Heyl reissued patent No. 9803.

Mr. Fenton, for the respondent, objects to the introduction

262 of this tool, claiming that it is not within the first and second claims of said patent, the only claims at issue and to be considered in this proceeding.

The master overruled the objection of the respondent and admitted the "Novelty" tool as the standard for the assessment of damages.

III. Mr. Pusey, for the complainants, agrees that the statement taken from the respondent's books and offered in evidence shall be accepted as showing the total number of machines known as the "Victor driver" made and sold by the respondent and the gross profits accruing to him, but asks that damages be assessed, as shown in the said statement, at the rate of $15.00 per gross, that being the net profit shown to have accrued to the complainants from the sale of their machine, the "Novelty paper fastener."

Allowed by the master.

IV. Mr. Fenton, for the respondent, asks that no damages be given, but agrees that the gross profits, as shown by their statement, be returned for the complainants.

Overruled.

263 *Findings of the Master.*

The master finds the following facts from the testimony:

1. The total number of machines known as the "Victor driver" manufactured and sold by the respondent between April 1st, 1882, and November 1st, 1883, to be 2,150.

2. That the gross profits of the respondent from these machines were $88.33.

3. That no net profit accrued to the respondent from the manufacture and sale of the "Victor driver."

4. That the complainants incurred pecuniary injury by reason of the infringement, and are entitled to damages therefor.

5. That the machine known as the "Novelty paper fastener" should be taken as a standard for the measurement of damages to be assessed, as it comes within the first and second claims of the Heyl reissued patent No. 9803.

6. That the complainants made a net profit of $15.00 per gross on the manufacture and sale of the "Novelty paper fastener."

264 The master begs leave therefore, in conclusion, to submit his report to your honorable court and assess the damages as follows:

The respondent, as shown by the statement taken from his books, has manufactured the infringing tool at a net loss, and, although he offers a gross profit of $88.33 to the complainants, there appears to be no actual gain or profit to compute or assess. Aside from this fact and entirely independent of it, the master has found that the complainants *has* sustained such pecuniary injuries as can be computed and ascertained in dollars and cents.

The master accepted the "Novelty paper fasteners' as a standard for the measure of damages, and, it appearing that there was a clear net profit to the complainants of $15.00 per gross upon all these tools made and sold by them, assesses damages to the complainants of $15.00 per gross upon 2,150 tools, the number made and sold by the respondent from April 1, 1882, to November 1, 1883, amounting to $225.75.

January 26, 1884.

LINCOLN MacVEAGH, *Master.*

265 *Complainants' Exceptions to the Master's Report.*

C. C. U. S. In Equity. Apr. Sess., 1883.

HEYSINGER *et al.* *vs.* CRAWFORD. } No. 40.

The complainants except to the said report—

Because the learned master erred in declining to entertain complainants' offer, as stated in clause 1 of said report, to prove that the respondent manufactured in addition to the "Victor driver" a machine known as the "Philadelphia stitcher," and that the latter machine was an infringement of the Heyl reissue No. 9803, and that damages should be assessed therefor.

Jan. 24th, 1884.

JOSHUA PUSEY,
Solicitor for Complainants.

266 *Exceptions of Respondent to the Master's Report.*

HEYSINGER *vs.* CRAWFORD.

The defendant excepts to the report of the master—

I. Because the master erred in not reporting that the defendant was only liable for the profit actually made in selling the devices adjudged to infringe the patent.

II. Because the master erred in awarding damages against the defendant based upon what the plaintiffs would have made in selling a like number of "Novelty" tools in that there was no evidence that the plaintiffs would have sold to the defendant's customers.

III. Because the master erred in awarding damages based upon a comparison of defendant's device with the "Novelty" tool made by plaintiffs, which latter device does not contain the combination patented by either of the two claims declared by the decree to have been infringed.

IV. Because the evidence was uncontradicted that the use
267 of the spring in the "Victor" tool made by defendant did not add to its market value, without which spring it would not be included within either of the two claims adjudged to have been infringed, and the master therefore erred in awarding more than nominal damages.

V. Because the evidence clearly established that the "Heyl original" tool made by plaintiffs, and upon which they pay royalty, and which is the thing patented by the claims adjudged to have been infringed, is a less valuable and profitable device than the "Novelty" tool made by plaintiffs, upon which they do not pay royalty, and which does not infringe either of said claims. The master, therefore, erred in adopting the latter device in estimating damages.

VI. Because there was no evidence offered by plaintiffs or claim made for either profits or damages based upon a comparison with

the "Heyl original" tool, which said tool (and not the "Novelty") is the thing patented by the two claims adjudged to have been
268 infringed; and in the absence of such proof the plaintiffs were entitled to nominal damages only.

January 24, 1884.

H. T. FENTON,
Counsel for Def't.

(Endorsed:) Master's report, with exceptions. Isaac W. Heysinger *et al. vs.* James P. Crawford. April sessions, 1883. No. 40. C. C. of U. S., eastern dist. of Pa. Filed January 28, 1884.

269 And afterwards, to wit, on the 7th day of May, A. D. 1884, came the parties aforesaid, by their counsel aforesaid, and this cause being called for argument on exceptions to master's report, and the same having been argued, the court, on the 26th day of May, A. D. 1884, entered the following decree, to wit:

In Equity. April Sess., 1883.

ISAAC W. HEYSINGER *et al.*
vs.
JAMES P. CRAWFORD. } No. 40.

And now, this 26th day of May, A. D. 1884, this cause having come on to be heard upon exceptions to the report filed by Lincoln MacVeagh, Esq., the master appointed by the court's interlocutory decree entered the 9th day of November, A. D. 1883, and the complainants' exception having been withdrawn and the defendant's exceptions having been argued by the counsel for defendant and for complainants, after consideration thereof it is ordered, adjudged, and decreed that the said exceptions of defendant be dismissed, and that the findings of the master are sustained.

And it is further ordered, adjudged, and decreed that the damages suffered by complainants in consequence of the unlawful sale by defendant of devices for inserting metallic staples, infringing the reissue letters patent No. 9803, dated July 12th, A. D. 1881, mentioned in said interlocutory decree, amount to the sum of two hundred
270 and twenty-five dollars and seventy-five cents; and it is further ordered, adjudged, and decreed that the complainants do recover of the defendant the said sum of $225.75, together with the costs of this suit, taxed at one hundred and forty-eight ⁰⁰ dollars, making in the aggregate the sum of three hundred and seventy-four ⁷⁵ dollars, and that the complainants have execution therefor.

And it is further ordered, adjudged, and decreed that the injunction heretofore ordered and issued against the said defendant be made perpetual.

271 And afterwards, to wit, on the day and year last aforesaid, the defendant, by his counsel, appeals to the Supreme Court of the United States in the following words, to wit:

Ap'l Sess., '83.

HEYSINGER
vs.
CRAWFORD. } No. 40.

And now, May 26th, 1884, the said defendant, by Hector T. Fenton his counsel, comes into court and prays an appeal to the Supreme Court of the United States from the final judgment and decree of this court entered in above-entitled case.

Which appeal is allowed and security ordered in the sum of $500.

272 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit. In Equity. April Sess., 1883.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. LOREN Heysinger, Copartners, Trading as The Philadelphia Novelty Manufacturing Co., and George W. Heyl
vs.
JAMES P. CRAWFORD. } No. 40.

Know all men by these presents, that we, James P. Crawford, defendant, and Caleb H. Horne, No. 1818 Green St., and William J. Brown, Jr., 1811 N. 20th St., as sureties, are held and firmly bound unto the above-named Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, copartners, trading as the Philadelphia Novelty Manufacturing Company, and George W. Heyl in the sum of five hundred dollars, to be paid to the said Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, copartners, trading as the Philadelphia Novelty Manufacturing Company, and George W. Heyl, their certain attorneys, executors, administrators, or assigns; to which payment, well and truly to be made, we bind ourselves, our respective heirs, executors, and administrators, jointly and severally, by these presents.

Sealed with our seals and dated this 21st day of July, A. D. 1884.

Whereas lately at a circuit court of the United States in and for the eastern district of Pennsylvania, in the third circuit, in a suit pending in the said court between Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, copartners, trading as the Philadelphia Novelty Manufacturing Company, and George W. Heyl, as complainants, and the said James P. Crawford, as defendant, a final decree was rendered against the said James P. Crawford on the 26th day of May, A. D. 1884, for the sum of three hundred and seventy-four dollars and seventy-five cents as for damages and costs and for an injunction, &c., and the said James P. Crawford, on the same day, in open court, having taken an appeal, which appeal has been allowed

by the said circuit court to the Supreme Court of the United States to reverse the said decree in the aforesaid suit:

273 Now the condition of this obligation is such that the said James P. Crawford shall prosecute his said appeal to effect and answer all damages and costs if he fail to make his appeal good, then this obligation to be null and void; otherwise to remain in full force and virtue.

JAMES P. CRAWFORD. [L. S.]
CALEB H. HORNE. [L. S.]
WILLIAM J. BROWN, JR. [L. S.]

Sealed and delivered in the presence of—
SAMUEL BELL.
H. T. FENTON.

Sureties approved.

WILLIAM BUTLER, *Judge.*

[Endorsed:] No. 40. April sess., 1883. Circuit court United States. Heysinger *et al. vs.* Crawford. Bond surappeal. Filed July 23rd, 1884.

273½ THE UNITED STATES OF AMERICA, *ss:*

To Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, trading as The Philadelphia Novelty Manufacturing Company, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States to beholden at Washington on the second Monday of October next, pursuant to an appeal filed in the clerk's office of the circuit court of the United States for the eastern district of Pennsylvania, in the third circuit, wherein James P. Crawford is appellant and you are appellees, to show cause, if any there be, why the judgment rendered against said appellant, as in said appeal mentioned, shall not be corrected and why speedy justice should not be done to the parties in that behalf.

Witness my hand this twenty-eighth day of July, in the year of our Lord one thousand eight hundred and eighty-four.

WM. BUTLER, *Judge.*

Service accepted this 6th day of September, 1884.

JOSHUA PUSEY,
Counsel for Complainants.

274 UNITED STATES OF AMERICA, }
Eastern District of Pennsylvania, } *sct:*

I, Samuel Bell, clerk of the circuit court of the United States of America for the eastern district of Pennsylvania, in the third circuit, do hereby certify the foregoing to be a true and faithful copy of the original pleas and proceedings in the case of Isaac W. Heysinger *et al.*, complainants, and James P. Crawford, respondent, on file and now remaining among the records of the said court in my office.

In testimony whereof I have hereunto subscribed my name and affixed the seal of the said court, at Philadelphia, this twenty-second day of September, in the year of our Lord one thousand eight hundred and eighty-four, and of the Independence of these United States the one hundred and ninth.

[Seal U. S. Circuit Court, E. D. of Pennsylvania.]

SAMUEL BELL,
Clerk of C. C.

Endorsed on cover: E. Pennsylvania C. C. U. S. No. 82. James P. Crawford, appellant, *vs.* Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, trading as The Philadelphia Novelty Manufacturing Company. Filed 10th October, 1884.

JAMES P. CRAWFORD,

Appellant,

vs.

In testimony whereof I have hereunto subscribed my name and affixed the seal of the said court, at Philadelphia, this twenty-second day of September, in the year of our Lord one thousand eight hundred and eighty-four, and of the Independence of these United States the one hundred and ninth.

[Seal U. S. Circuit Court, E. D. of Pennsylvania.]

SAMUEL BELL,
Clerk of C. C.

Endorsed on cover: E. Pennsylvania C. C. U. S. No. 82. James P. Crawford, appellant, *vs.* Isaac W. Heysinger, Christian H. Hershey, and J. Loren Heysinger, trading as The Philadelphia Novelty Manufacturing Company. Filed 10th October, 1884.

123-589

FILED
NOV 8 1887
JAMES H. MCKENNEY

Supreme Court of the United States.

No. 82. October Term, 1887.

JAMES P. CRAWFORD,
Appellant,

vs.

ISAAC W. HEYSINGER, CHRISTIAN W. HERSHEY, and J. LOREN HEYSINGER, Copartners, trading as THE PHILADELPHIA NOVELTY MANUFACTURING COMPANY.

BRIEF FOR APPELLANT.

HECTOR T. FENTON,
Counsel for Appellant.

PHILADELPHIA:
DUNLAP & CLARKE, PRINTERS AND BINDERS, 319-21 FILBERT ST.
1887.

Supreme Court of the United States.

JAMES P. CRAWFORD,
Appellant.

vs.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. LOREN HEYSINGER, Copartners, trading as THE PHILADELPHIA NOVELTY MANUFACTURING CO.
Appellees.

No. 82.

October Term, 1887.

STATEMENT OF THE CASE.

This is an appeal from the Circuit Court of the United States for the Eastern District of Pennsylvania, by James P. Crawford, who was defendant below, and against whom the said Court entered a decree in equity for the payment of $225.75 and costs, and awarding a perpetual injunction, at the suit of Isaac W. Heysinger, *et al.*, trading as The Philadelphia Novelty Manufacturing Company, appellees and complainants below.

The bill is founded on Re-issued Letters Patent of the United States, No. 9,803, dated July 12, 1881, for the remainder of the term of seventeen years from September 25,

1877, granted to Henry R. Heyl, for an "Improvement in Devices for Inserting Metallic Staples."

The bill, which was filed June 9, 1883, recited the grant of the original patent on September 25, 1877; the re-issue thereof on July 12, 1881; the plaintiff's title thereto; and charged the defendant with infringement of the exclusive rights of the plaintiff under said Re-issued Letters Patent, in the manufacture and sale by said defendant of paper fasteners, known in the trade as the "Victor Staple Driver," and so identified in the proofs afterwards taken. The defendant operated under two patents, viz: Brown's patents of August 5, 1879, and July 4, 1882.

An answer was filed setting up these two patents under which the defendant was a licensee, and contending that under any proper construction to be given to the plaintiff's Re-issued Patent, in view of the state of the art, the defendant's device did not infringe; also denying patentable novelty; also that the re-issue was void, as not being for the same invention for which the original was issued, and that any rights the patentee might have had to remedy defects therein by re-issue were lost by laches in applying for such re-issue.

The mechanical devices or models offered in evidence as Exhibits A, B, C, and D represent:

(1) The "Victor" tool, Exhibit A, made by appellant and shown in Brown's Patent, Record, page 151.

(2) The "Heyl" tool, Exhibit B, made by appellees under Heyl license, see Patent, fig. 1, Record, page 27.

(3) The "Novelty" tool, Exhibit C, made by appellees, and shown in their Patent, Record, page 119.

(4) The Heyl inverted tool, Exhibit D, made by him a year or so after his original patent, and after the issue of numerous other patents showing the advantages of such inversion of the parts; see his testimony on page 15 of Record, ans. 6, and Somers' patent on page 142 of Record.

Proofs were taken by plaintiffs and by defendant, and the cause having come on to be heard thereon, the Circuit Court, on November 9, 1883, entered a decree sustaining the Re-issued Patent as respects the first and second claims thereof, holding that they were the same as the fourth claim of the original, and that appellant's device infringed the same, and awarding an injunction and account of profits and damages accordingly. By the same decree the cause was referred to a Master to take and state an account, who reported in favor of the complainant, finding that the appellant had made no profit, but awarded damages against him to the extent of the profit the complainants would have made on a like number of their tools had they made and sold the same; amounting to $225.75. Exceptions were filed by the defendant, which were overruled after argument, and a final decree for said sum of money, with costs of suit, was entered May 26, 1884, and the injunction made perpetual, from which decree the defendant appealed.

SUBJECT MATTER OF THE PATENT.

Long prior to the date of Heyl's alleged invention, mechanism operating by hand, foot, and steam-power, to insert and clinch metallic staples in books, papers, etc., was well known and extensively used. Such staples consisted of a piece of wire with the ends bent up at a right angle, so as to form a crown with parallel legs; and they are used to fasten together the leaves of books, sheets of paper, two or more

pieces of any penetrable material, and for various other like purposes in the arts. It was then well known that to insert the staple without bending the legs the latter must be supported laterally while the pressure is exerted on the crown in the process of insertion. To accomplish this it was only necessary to provide a staple case, in the form of a flat tube, and insert therein a sliding driver or anvil, in the form of a flat piece of metal; the staple being inserted in the tube, crown inwards, and ejected therefrom by the driver or anvil striking it on the crown. This instrument was well known, and is shown in Tomlinson's patent. (See Record, page 84, Exhibit 6.) It was also well known that if the legs of the staple are brought to bear against a concave surface, when driven, that they will be bent inwardly, or clinched, as it is called. Such a device was in common use to bend the ends of staples and button prongs. (See Exhibits 8, 9, 14, and 22.) It was also well known, and so recited in earlier patents, that if a staple-driving instrument, as described, was placed on one side of a layer of papers or other material, and a staple clincher, as described, was placed on the other side of such papers, that percussive force (as distinguished from mere pressure) on the staple driver would force the staple through the material without previously puncturing the latter to form holes for the legs to pass through.

With this information as part of the common stock of knowledge, many patents were applied for and issued for various forms and combinations of these parts in hand and power machines, notably the latter, and such patent claims were accordingly restricted to the specific forms and combinations shown and described therein. Most of these, however, were

for combinations of mechanism for operating the inserting and clinching devices with relation to each other.

The prior patents offered in evidence fully and clearly show such an advanced state of the art, at the date of the original patent, that the field of invention at that time was confined within very narrow limits. Every one of the essential elements of the Heyl device had been used, both separately and in various combinations, many years previously. It was, therefore, only open to this inventor to devise some special form of one or more of these parts, or some special combination of them. What he did in this respect is fully, clearly, and accurately described in the original patent, though the claims thereof are fully anticipated by the references produced. Indeed, so overwhelming was the force of the prior patents, that Heysinger, one of the plaintiffs, admitted that at least "the first and second claims of the original could not have been sustained" (see his testimony, Ans. 18, page 161); and Heyl, the patentee, admitted (Ques. 24, page 18) that the re-issue could not be construed to cover the appellant's device if the guide arm was omitted, that is to say, a recessed clinching base used in connection with a detached staple driver and staple case, would not be the machine of the Re-issued Patent, without a guide arm, or its equivalent frame, forming part either of the clinching base or of the staple driver, so as to guide and bring the parts together. The recessed clinching base was proven and admitted to be old; the driver moving in a staple case was proven to be old; and the combination of these parts in a power machine was proven to be old. Various patents contained in the Record were made use of to show this advanced state of the art, but more particularly was it shown

in a hand-lever machine patented to J. C. Smyth February 6, 1887. (Exhibit 14), see Record, pages 117 and 118.

This patent shows every element of the Heyl device in the same combination; and the examination of it by the witnesses on both sides was specially directed to it on the subject of novelty. Heyl was not examined concerning it. Heysinger, the plaintiff, in his testimony concerning it, admitted that the elements common to the Smyth & Heyl machines were "means of forcing out a staple from a case, by a contained plunger, and bending the legs against a concave recess" (see page 163, Ques. 28), and that the alleged novelty of Heyl's device consists in the arrangement of these parts on a frame, or with respect to each other, so that they will admit of being adjusted to any thickness of paper [by which he meant pivoting their supporting arms, as a hand-stamp is constructed, or in the form of plyers]; in the hand knob, and in its being a desk tool. These may be novel features in the sense of making the tool a more perfect one mechanically, but appellant contended that they involve no *patentable* novelty or invention.

The patentee, Heyl, combined them thus, as shown in his patent drawings: Taking the ordinary form of seal stamp, which has a pivoted arm (see Fig. 5 of the patent, see Record, page 27), or the ordinary form of desk stamp (see McGill's Patent, of August 13, 1867, Exhibit No. 7 Record, page 86), the well known recessed clinching hammer was placed on the upper arm, and on the other or lower arm or base was placed what is substantially the old Tomlinson driver, above referred to, and (the latter element being thus placed upside down) the tube sliding up and down on the metal driver, instead of the driver sliding up and down in the

tube, it was therefore necessary to add a spring (D) *under* the tube to cause it to retract, or a spring D^1 between the two to keep it up by friction, so as thereby to always leave the tube, in its normal position, so much above the end of the driver that a staple could be placed and supported in the slot thus formed by this position of the tube and driver. This constituted his whole arrangement, and it differed only from what preceded it, in reversing the relative position of the driver and clincher, and embodying them in the well known form of hand stamp as a desk tool.

The original patent in this case is the only one among the early ones issued that attempted, in view of the then advanced state of the art, to assert any elemental claim; but, as seen by the record herein, the patentee was obliged to abandon the first three of the four claims that it contained. The first, for the recessed clincher, was proven and admitted to be old; so with the second and third claims, which were for the staple driving tube and driver, leaving only the fourth and last claim, which was for the combination of the driving and clinching mechanism; but its phraseology (irrespective of the state of the art) is such as to restrict it to the precise construction of device shown in the drawings and described in the specification. It is quite true that it ought to have been so phrased as to *expressly* include the "sliding guide B" as an element, and also the spring D or the spring D^1 between the guide B and the anvil A; and this is the only possible defect to be found in the original claim and the only warrant for a reissue; but it is more than likely that, as these parts are plainly needed to make the combination operative, any Court would, in construing the claim, have included them by implication, otherwise the claim would have been meaningless.

An examination of this claim, in view of the state of the art, is convincing that it is the only one that could possibly afford the least ground for being sustained, and then only in a narrow and restricted sense, by impliedly including not only the frame, but the sliding tube and friction spring as elements. Manifestly and admittedly the inserting mechanism and the clinching mechanism were old; neither this patentee nor any one else had any right to a broad claim which would include *every means* of combining them; hence subsequent patents for each new combination of them must be limited and restricted to the precise combination shown. The doctrine of equivalents has no application to such a state of facts. What Heyl did was simply to embody them in the well known forms of hand stamp so as to make it a desk tool, and in so doing reversed the relative position of the parts. If there is any invention involved in so doing, it must be in the reversal of the parts and the consequent new arrangement of them; for it certainly does not involve invention to place the parts in a desk tool over placing them in a power machine. There is no "general arrangement of the parts," * * * so that "they will admit of being adjusted to any thickness of paper," as spoken of by the patentee's expert, any more than there is in the Smyth machine. Such remarks would apply only to Fig. 5 of the patent, and that is not claimed to be thereby different from the form shown in Fig. 1, and is certainly not patentably different.

Formerly and naturally the clinching part was the *base*, and the inserting device was the *upper* arm; and this did not permit the staple to be *supported* in the tube. In some of the power machines the staple was so supported, by placing the parts in a horizontal position relatively to each other, or

by a spring holding the staple (as in Smyth); but Heyl conceived the idea of reversing the position of the parts, so as (by placing the inserting device on the *base* of the tool) to thereby facilitate the insertion of the staple by hand into the open mouth of the tube, and also thus make the staple tube and its contained driver *support* the staple until it was driven, and this reversal of the parts *necessitated* the use of a spring D to support the tube and keep it above the end of the driving blade, or a spring D′ between them to effect the same end by friction. It is somewhat curious that even this friction spring D′, is borrowed from Smyth; for as its only purpose is to keep the staple tube open, the spring k, of the Smyth machine, operates to produce the same result, as it holds the staple in place in the tube below the staple blade.

It must therefore be manifest that if the Heyl Patent contains anything patentable at all, it must be for the specific combination and arrangement of the parts shown and described in the drawings and specification. Indeed, the language of the claim is imperative. It reads: "The combination of the *stationary* staple *support* or anvil A with the *reciprocating* slotted or recessed hammer, etc." How can it be said that the claim covers a *movable* anvil or staple blade without entirely ignoring and eliminating the words "*stationary*" and "*support*" from the claim? And again, how can it include a *fixed* recessed clinching base without striking out the word "*reciprocating*" from the claim?

This Court has so often said that where a patentee uses words in a claim which are words of limitation, but which are at the same time in accord with the description and drawings of the thing claimed, he is bound thereby, even though it afterwards appear that they were not coextensive with the

invention. If this were not so, the public would be deceived and misled by finding that plain limitations were really elastic inclusions.

The original patent thus contained but a single claim (the fourth) that even the appellees contend covered, or was intended to cover, anything they had a right to claim as new. The record shows that the appellees were, as early as 1880, making a device called the "Novelty" paper fastener, which is substantially the same (for the purposes of this case) as the appellants' "Victor tool." Hence the appellees, having secured license and assignment, under the Heyl original patent in question, proceeded to re-issue it. It is not open to dispute, for it shows on the face of it that such re-issue was sought for the purpose of covering just such tools as the Novelty and the Victor, neither of which would have been within the limits of the original fourth claim, even though that claim had expressly included as an element (to make it operative) the "sliding guide B," which omission is now said to be the main defect for which the re-issue was asked.

There is no substantial variation between the descriptive parts of the original and re-issued patents, except the insertion into the re-issue of an additional description of Figs. 1, 2, and 3, in the two paragraphs immediately preceding the claims of that patent. The claims of the re-issue are, however, eight in number. The *first* intentionally, no doubt, omits the "spring D or D'" without one of which the device therein shown could not possibly be operated in the manner shown and described; but as the guide is said to be a "sliding" guide, the spring would be included by implication. It is in almost the exact language of the fourth claim of the Original Patent, but includes expressly the "sliding staple guide." It is really the

only properly drawn claim in the whole instrument, and should be construed as the original fourth claim would have been; the *second* is for the device shown, as a complete tool, but omits the limiting word "stationary" of the Original Patent; the *third* is the same as the second, when the driver and clincher are attached to each other so as to be adjustable with relation to each other, presumably as in Fig. 5, and omitting all limiting words and clauses; the *fourth* is precisely the same as the third, but including the knob as an element; the *fifth* and *seventh* are substantially the same as the *second* and *third* of the *Original* Patent, both of which original claims, it is conceded by the witness Heysinger, could not have been sustained, and which are shown by the proofs to be very old; but it is not necessary to consider them in this connection, as defendant's device does not involve that mechanism, and he is not charged with infringement thereof. The *first* claim of the Original Patent is dropped entirely. The *sixth* and *eighth* claims remain to be considered; the former is identical with the *third* claim, but omitting the spring as an element; and the latter is for the combination claimed in the *fourth* claim, but confined to an implement in which clincher is reciprocated, and the parts attached to each other, of the form shown in the drawing, and constituting an implement to be operated by hand only.

Of these claims, apart from the first, which is substantially the same as the fourth of the Original Patent, and the fifth and seventh, which are wholly lacking in novelty, as conceded, the second, third, fourth, sixth, and eighth, are stripped of all qualifying and limiting words found in the Original Patent, and are all of them framed with the manifest idea and intention of including a device which is substantially the Novelty and Victor

tools, namely, a hand stamp, in which the spring may or may not be used, and in which the parts may be reversed and put back as they formerly were, viz.: a clinching *base* and an inserting device as an upper arm, whether detached or not; in brief, any and every form or means of combining the old elements of driver and clincher that takes the form of a hand or desk tool.

Irrespective of the fact that such expansion of the claims, in a re-issue renders it *pro tanto* void as respects the added claims; it is, as to such claims, a patent for a different invention; but if justification could be found within its corners for such additional clauses of claim, the rights of the public and of other inventors, accruing doing the four years, nearly, before it was applied for, bar the assertion at this time of any such alleged right.

THE ISSUES.

Upon the hearing of the cause the plaintiffs argued for an injunction as respects claims one and two mainly, while in the proofs (see Heyl, p. 16, Ques. 9 and 10) it was claimed that defendant infringed the second, fourth, and eighth claims, and "possibly," as he said, the first and sixth. The opinion and decree of the Court, however, deals with the first and second claims only, and properly so; hence the final disposition of the question of infringement will depend upon the construction to be given to these claims. It was undisputed that the appellant made a device called the "Victor" tool, and the comparison is to be made with that. It was in evidence in the cause, and is fully illustrated in exhibits 23 and 25, Brown's Patents of August 5, 1879, and July 4, 1882, under which the appellant is a licensee. Under the issue of novelty, and of patentable novelty in view of the state

of the art, many prior patents were offered in evidence, reliance being placed mainly upon those which showed the staple inserting and the staple clinching devices, separately; and finally, J. C. Smyth's patent, of February 6, 1877, which shows them in combination. Others of those offered, bearing date, some of them prior to the original Heyl Patent, and some afterwards, but before the date of the re-issue thereof, were made use of to show the recognition by the Patent Office authorities of the independent rights of such patentees as not conflicting with the original Heyl machine. The file-wrapper and contents of the application for the re-issue was put in evidence to prove, among others, the requirements of the Patent Office that qualifying terms should be used by the applicant, and which words were so afterwards used and inserted as words of limitation into several of the claims; notably the word "stationary," with respect to the staple blade, and the word "reciprocating" with respect to the clinching device. These were all-important words in construing the claims. The appellant therefore mainly contended in the Court below for such a limited construction of claims one and two as the plain meaning of the words would imply, and as the fourth claim of the original would have been construed; and hence, if so construed, there was no infringement. The defendant further contended that if such claims were not so construed, but if interpreted to mean more than the specific arrangement and combination shown in the drawings and claimed in the original patent, then the re-issue was void as being for a different invention; and further that if the patentee was the first inventor of more than his original claims covered, and had under other circumstances the right to amend his claims accordingly by means of a re-issue, he

had waived or lost such right by his laches. Finally the defendant contended that, in view of the state of the art as disclosed by the J. C. Smyth patent and others, the patent in suit was void for want of novelty, or at least that the changes made by Heyl were merely mechanical changes, and involved no invention or patentable improvement.

INTERLOCUTORY AND FINAL DECREES.

The case having come on to be heard on the pleadings and proofs, an interlocutory decree was entered in favor of complainants, adjudging the first and second claims of the re-issued patent to be valid, and that the defendant had infringed the same. Thereupon a perpetual injunction was awarded as respects the matter of said two claims of the patent; and the cause referred to a Master to take and state an account of profits and damages. [For decree, see page 165 of Record and Opinion, on which it is based, on page 163.]

The Court, as indicated in its opinion, evidently thought that the portable desk tool feature of the combination constituted a patentable difference over Smyth and prior devices, and was led to its conclusion on the apparent external differences in the machines, due to the additional parts in the Smyth device; and thereupon erroneously giving such a broad construction to the claims as not only to cover the specific combination involving the desk tool feature, shown in the patent, but every other combination of the parts in a combined portable form to adapt them for use as a hand tool; while perhaps the Court was influenced to the defendants' prejudice (as would appear from the opinion) from the fact that the defendants principal witness and licensor had been previously made defendant in a suit on the same patent, and had not therein

made use of the Smyth patent as an anticipation; and while there may or may not have been reason for this, the fact should not have operated to the prejudice of a stranger.

The cause having been referred to a Master, proofs were taken, which resulted in showing that defendant had made no net get or profit on the Victor tools made and sold by him during the period covered by the accountings but the Master found that he had made and sold 2,150 of such tools; and without any proof that defendant's sales had in any manner interfered with the plaintiff 's sales of the Heyl tool, awarded to the plaintiffs, as damages, the profits they would have made on a like number of "Novelty" tools had they made and sold the same; to wit, the sum of $225.75; though it was strenuously objected by defendant that comparison with the "Novelty" tool was unfair and improper, and though it plainly appeared from the proofs that a comparison with the "Heyl" tool [also manufactured and sold by the plaintiffs, and which was really the patented tool, and the proper one to make the comparison with], would have been barren of profitable result to the plaintiffs. Exceptions were taken to the report and findings of the Master, which were overruled by the Court, and a final decree entered. [For decree, see Record, page 175.]

ASSIGNMENT OF ERRORS.

The opinion of the Court below, on which the interlocutory decree for injunction and account was based, refers only to the matter of the first and second claims of the patent, to the question of novelty as put in issue by the Smyth patent, and in a general way to the consonance of the re-issue with the original patent. The important question of patentability as

controlled by the evidence of the state of art, and the consequent construction to be given to the claims as decisive of the question of infringement, did not seem to claim the Court's attention.

First. The Court below erred in sustaining the first and second claims of the re-issued patent as being for the same invention as that claimed in the fourth claim of the original patent; because, as construed by the Court, they were manifest enlargements thereof and unwarranted by anything found in the original grant.

Second. The Court below erred in sustaining the first and second claims of the re-issued patent as valid, because, as construed by the Court, the matter thereof was clearly anticipated by the J. C. Smyth Patent, Exhibit 14, and was otherwise shown to be lacking in patentable novelty.

Third. The Court below erred in sustaining the re-issued patent as valid, because in view of the state of the art, it did not involve invention, or constitute a patentable combination, to merely locate the old inserting and the clinching devices in the well-known hand stamp or desk tool without substantial alteration of any of the three elements thus brought together, or causing them, or any of them, thereby to perform any new, additional, or different function.

Fourth. The Court below erred in not finding the issue of infringement in favor of defendant and dismissing the bill, because the state of the art, as well as the original patent, required such a limited construction to be given to the claims of the re-issue as to exclude the appellant's device.

Fifth. The Court below erred in not construing the first and second claims of the re-issue to be for the specific device

set forth in both patents and claimed in the fourth claim of the original patent, viz.: a desk tool with a *reciprocating* clinching device and a *stationary* staple blade in combination with a sliding guide and spring.

Sixth. The Court below erred in sustaining the re-issued patent as valid, because in view of the state of the art showing the same elements in substantially the same combination in a power tool, it did not involve invention to reduce the size of the machine so as to make of it a desk tool or hand-stamp.

Seventh.—The Court below erred in not decreeing the Re-issued Patent to be void, in so far as it claimed anything beyond the matter of the fourth claim of the original patent, because all else was new matter, wholly unwarranted by anything contained in the original grant.

Eighth.—The Court below erred in sustaining the first and second claims of the Re-issued Patent, and construing the same broadly to cover more than the narrow and restricted fourth claim of the original patent, because whatever right, if any, the patentee might have seasonably had to enlarge the said claim by re-issue, was lost, abandoned, and waived by laches in neglecting for nearly four years to make such enlarged claim or claims, and adverse rights, by patent and by public use, having intervened.

Ninth.—The Court below erred in sustaining the Master's Report and overruling appellants' third, fifth, and sixth exceptions thereto, because the comparison of appellants' machine as to cost, price, and profit was not made with the Heyl patented tool, but with the appellees' "Novelty" tool, which is wholly different in many respects, and not that upon which the Court decided the question of infringement.

Tenth.—The Court below erred in sustaining the Master's Report and overruling appellants' second exception thereto, which was as follows: "2d. Because the Master erred in awarding *damages* against the defendant, based upon what the plaintiffs' would have made in selling a like number of "Novelty" tools, in that there was no evidence that the plaintiffs would have sold to defendants' customers."

Eleventh.—The Court below erred in sustaining the Master's Report and awarding substantial damages, as such, against the appellant; for that there was no evidence to show that the profit claimed to have been made by the appellees on their "Novelty" tool was in any manner due to the patented feature; or that the appellants' sales had in any manner interfered with or prevented sales by the appellees to the same purchasers; or, in fact, any evidence in the cause, of any character, to warrant more than a nominal award.

POINTS OF ARGUMENT.

I. *The state of the art, and herein of the novelty and patentability of Heyl's alleged invention.*

Novelty in a mechanical sense does not always involve or include novelty in a patentable sense; hence mechanism improved by the expected skill of the calling of the artisan to adapt it to a particular and even novel but analogous use, may render such mechanism of greater utility, yet this is not necessarily invention. In like manner old and well-known combinations of mechanism may, by slight changes in arrangement of the parts, make such combinations useful for other but analogous purposes, for which they never were used before, yet the new arrangement, unless it operates differently, or produces a substantially new result, lacks patentability. Authorities in sup-

port of these propositions are hardly necessary; they are fundamental law. Applying them to the facts presented by the case at bar, the patent involved here has very little, if any, support to rest upon. The opening clause of the specification stating whereof the improvement consists, impliedly admits that the elements that perform both the staple inserting and the staple clinching are old, are combined in this machine without substantial change in their structure, and that the only novelty claimed consists in arranging them in "an implement of the form of a hand stamp." The appellee's expert seems to take the same view of it. See Record, page 161, Ans. 19.

A. 19. "*The first three claims of the original were entirely outside of the statement of invention in the specification, which reads, 'My invention consists of an implement in the form of a hand stamp, by which metallic staples may be forced through sheets of paper documents, and secured by clinching the legs on the reverse side.' The form of a hand stamp marked the general adaptation and construction of the parts, while the sheets of paper documents marked the miscellaneous character of the work for which it was adapted, in contradistinction to previous tools made for use on edition of pamphlets.*"

Apart from this implication to be drawn from the patent itself, the evidence of the state of the art shows not only that both elements named are separately old, but that both have been combined for the same purpose as the machine of the patent in question. The evidence in the cause also shows, by the admissions in testimony of the patentee Heyl, and of the appellee Heysinger, that this is so, Heyl admitting (see Record, page 18, Ans. 23 and 24) that the appellant's device (the Victor tool) would be no infringement if the guide arm

was not used. Hence the contention on the part of the appellees now is, not that the patent is valid for any separate element, nor even for every combination of the elements, but for a combination of them in a particular manner, to wit: in the form of a hand stamp or desk tool. The determination of the question of patentable novelty, therefore, turns upon whether or not the combination of these admittedly old elements in the Heyl machine was a substantially new combination of them, or merely a new arrangement thereof not substantially different from the old combination of them, and not differing therefrom in mode of operation and result Step by step the appellees were compelled, by the closeness of the similarity of the devices of the prior patents offered in evidence, to abandon all the claims of the original patent except the fourth, which they rested upon (see Heysinger's testimony, Record, page 161, Ans. 18 and 19); and whatsoever is not justified and supported by that claim will receive no help from the numerous claims of the re-issue. Lastly, the Smyth patent, Exhibit 14 (see Record, page 117), was offered as a complete anticipation, or at least as presenting so much of the Heyl device that the difference was impossible of patentable definition. The appellant's expert witness testified fully concerning it, and, comparing the two devices, said (Record, page 40, Ans. 42): "I find them working the same, producing the same result, and operating in just the same combination." He was cross-examined at length, without weakening his statement in any respect. Heyl, the patentee, who was examined in chief, was not called to rebut this proof; but Heysinger, who is one of the appellees, who acted as attorney for Heyl in procuring the re-issue, and who was also his own expert witness, was examined in rebuttal concerning

it. The appellant may safely rest the disposition of this question upon his answers (see Record, page 159, end of tenth answer, and 19th and 28th answers, on pages 161 and 163), wherein he says: "The elements common to the Smyth and Heyl machines are simply means of forcing out a staple from a case by a contained plunger, and bending the legs against a concave recess. These elements are old, and were shown in United States Patents * * * No claim is made on the Heyl Patent, as I understand it, for any such combination, except as adapted by him for uses in the general combination described." And see his 28th x Ans., Record, page 163, following up this subject.

The Record is full to overflowing, showing in various power machines the combination of staple driving and staple clinching mechanisms; hence the appellee Heysinger, in his 10th and 19th answers, above quoted from, was quite right in disclaiming a general combination of these elements and confining the patent to the matter of the original fourth claim as covering only a particular arrangement of these elements in combination, viz.: in the form of a hand-stamp, or desk tool to be operated by hand, in which the stapling device and the clinching device were, as he alleged and argued, opposite compressing jaws acting automatically to adapt them to hold various thicknesses of paper to be stapled, and that hence this feature of alleged automatic compression marked a patentable departure in the Heyl device from former combinations of the same elements. But all these alleged novel functions exist, not in the patent, but in the proofs; the original patent says nothing about automatic compression or opposite jaws, and while some of the claims of the re-issue use the term "opposite jaws," no such words or any equivalent language is found in the specification.

In point of fact the machine has no such function as automatic adjustment or compression, and Fig. 5 of the drawings is the only arrangement shown which may properly be said to have opposite jaws, and it is in point of fact the equivalent of pliers, and it is not novel with this patentee apart from its use in holding staple inserting and staple clinching devices; while the other form shown in the patent is precisely the well known form of hand-stamp shown in McGill's early patent of 1867 (Exhibit 7, see Record, page 86), and has no vibrating or compressing jaws of any kind. These two forms are not patentably different, and are stated in the patent itself to be equivalent devices.

Again, it is admitted in the appellees' proofs that the retracting spring D, to force up the sliding staple-case, is not an essential feature, and may be omitted. (See Exhibit D, produced by Heyl, Heysinger's testimony, Ques. 8, Record, page 156, and Ans. to Ques. 10, folio 231, page 158.) The patent itself also proves this, because the drawings show and the specification describes a friction spring D′ as the equivalent of the retracting spring D, the main and essential function being simply to *hold* up (not *bring* up) the sliding tube above the end of the contained driver, so as to be able to insert a staple in the open end of the tube; and this is accomplished whether raised by hand and there held by the friction spring D′, or both raised and held by the retracting spring D; and the patent states them to be equivalents. Heysinger's testimony also admits this inferentially, where he says (Record, page 158, Ans. 10, folio 231), "the *retracting* spring to *bring* up the plunger will *save one motion of the hand* and allow the same to occupy itself with inserting a fresh staple, thus expediting the operation of the machine." The language is carefully

chosen, but is absolutely true. With the parts reversed—*i. e.*, the recessed hammer as the *base*, and the staple tube and plunger as the *upper* arm, *no retracting or other spring is necessary*. This is clearly proven in the cause; is admitted by Heyl, and shown in his Exhibit D; and is proven by the machine itself. But with the parts as arranged in the Heyl patent—*i. e.*, with the staple tube and plunger as the *base*, something must be used to *hold up* the sliding tube while a staple is inserted. Hence the original patent described a friction spring D′, or its equivalent spring D; the former is merely a friction spring, and *holds* the sliding tube in place when lifted up by the hand; while the latter not only *holds* it up, but of itself *lifts* it up. Hence Heysinger's remark above quoted, that "the *retracting* spring to *bring up* the plunger *will save one motion of the hand*." But the point made is that the only *necessary* function of the spring in this machine is the *holding* up, and not the *bringing* up, of the tube, and that both D and D′ perform this function in precisely the same manner, and are described as equivalents in both the original and re-issued patents in the following language: "The normal position of the guide B (the sliding staple tube) is elevated, and in order to *keep it* in this position, or *from dropping prematurely*, I employ a spring D, which may press up *under* the guide, or a spring D′, which may press *against* it, and thus produce the necessary friction." No such word as "retracting" in connection with this spring is found anywhere in the patent; no such function is therein assigned to it; no claim is made for it in the original patent, and no attempt at this time to distinguish between the Heyl device and those that preceded it, on the ground that the spring of the Heyl device has any additional function beside that of a *friction*

spring, to *hold up* the tube, is at all sustainable under this state of facts.

Without referring in detail to the many prior patents contained in the record, showing combinations of staple-inserting and clinching mechanisms, it will suffice to show an advanced state of the art to refer to those granted to the same patentee, particularly those dated March 28, 1876, and October 24, 1876. (See Record, pages 97 and 100.) With reference to the latter, Heyl testified, under cross-examination, as follows. (See Record page 18.)

X Q 27. Will you please look at Letters Patent granted to you October 24, 1876, for a machine for forming, inserting, and clinching staples, and state if you do not find therein staple guiding and driving mechanism in combination with a guard-plate N, 'having a narrow slot, with two countersunk enlargements in it at points opposite to the entrance of the staple legs,' for guiding the latter towards each other, and serving partially to clinch the same?

A 27. I find the devices described in the question, but the said slot in the guard-plate, having two countersunk recesses in it and having no bottom, is merely a guide to direct the two opposite staple legs into position where the two rotating clincher jaws may certainly strike them, and bend and clinch the same, so that the element of an unmovable recess clincher and the element of a reciprocating driver provided with a knob, are not found in said machine described in said Letters Patent.

X Q 28. Apart from the knob, however, you find in that patent, do you not, a reciprocating staple guiding and driving mechanism in combination with a slotted guard-plate, to direct and partially bend the staple legs toward each other?

A 28. Yes, sir."

The witness, having thus attempted to distinguish between the slotted guard plate of this patent and the recessed clincher plate of the patent in suit, was further cross-examined, as follows: (See Record, page 20.)

X Q 35. "*In this patent of October 24, 1876, are the clincher-plates in the position shown in figure 5, when in a state of rest, and before beginning the operation of flattening down the ends or legs?*

A 35. The drawing, figure 5, represents them in a state of rest before they are operated to perform the function of clinching.

X Q 36. That being so, the staple-legs, after being forced through the paper, bear against the inclined faces of these clincher-plates, and are slightly turned inward, as set forth in that patent, and shown in figure 5. Is not that so?

A 36. Yes, sir."

A reference to these figures of the drawings of this plate will show the clinching done quite as effectually as it was intended to be done by the "recessed hammer" of the original patent on which the re-issue in suit is founded, that patent containing express directions and means for flattening down the staple legs after they are bent towards each other by the recessed hammer.

Again, the feature of inserting and clinching a staple by sudden percussion, as distinguished from mere pressure, is found in the patent of Heyl & Brehmer of October 8, 1872, Exhibit 10. (See Record, page 92, lines 16 and 17.)

The witness, Heyl, was further interrogated, as follows, to show, beyond cavil, that he was not the first to use a recessed hammer, alone and without other aids, to clinch staple legs. Also, that he was not the first inventor of a staple-inserting

device consisting of a sliding tube and its contained driver, such as described in his patent. (See Record, page 22.)

X Q 45. "*You are aware, however, that it was not novel with you to use a recessed clinching anvil?*

A 45. Yes, sir.

X Q 46. Are you familiar with Letters Patent No. 56,884, dated August 7, 1866, to A. C. Betts, and also Patent 132,221, dated October 15, 1872, to J. Tomlinson, both for staple guiding and inserting devices?

A 46. I have seen both patents referred to.

X Q 47. Do not they both describe a tube for holding a staple, in which tube is a sliding hammer, to be operated for driving a staple down through paper stock or other material?

A 47. Yes, sir; so far as the action of the tool is described in the question, leaving out the purpose or the material to be stapled, which I do not remember about."

But to remove any doubt as to whether the patentee Heyl originally intended to make claim to any of the elements, or even to their general combination, but only to their arrangement in a hand stamp, he was further cross-examined: (See Record, page 17.)

X Q 15. You probably did not understand my question. Did you mean to say that you are the first inventor of a staple-guide, B, of an anvil, A^1, of a coil-spring, D, and of a reciprocating-driver, with a knob to it, or any of them, alone and separate from the others?

A 15. I did not mean by my answer that these devices, separate from the other, formed in themselves elements of distinct novelty; I meant that their combination for the purpose specified was novel.

X Q 16. And that only. Is not that so?

A 16. I think it is.

And again, to get upon the record a more specific definition of the scope of his alleged invention, as understood by himself, and to compel him to define its distinguishing characteristic which represented to his mind its sole patentable quality, he was interrogated as follows: (See Record, page 24.)

X Q 61. Do you consider it an essential feature of your invention, that a device should contain a knob or other equivalent means of operating it by a blow of the hand, in the absence of which, such device would not be in the claims of the patent?

A 61. I do consider it essential to the device that the process of inserting the staple should be in some means by the force of the hand, as the tool is intended to be a hand-operating tool, and not one of the class termed as power tools, or those operated by foot-treadle.

To further inquire as to whether or not a machine operated by a lever, which construction would be wholly inconsistent with the theory of so-called "automatic adjustment of the jaws," the witness was asked: (See Record, page 24.)

X Q 63. If the reciprocating anvil—or, in case of inverting of the parts, the staple driver—was operated directly by a hand lever, would that be the equivalent of your knob to be struck by the hand?

A 63. Said device would contain all the equivalents, with the addition of a lever.

And, of course, in such a device, if a lever was used to draw up the driver in the sliding tube, it is manifest that no spring of any kind is needed, and this was admitted by the appellee's expert. Again, the witness was examined as fol-

lows, in view of the Smyth patent, afterwards offered in evidence, to obtain his own views of what would be a mechanical equivalent of this device: (See Record, page 24.)

X Q 64. If in figure 3 of the Re-issued Patent the parts were reversed, and the clinching anvil stationary at the bottom, and the staple guide reversed and put at the top of the device, would you consider such a construction to be within the claims of this Re-issued Patent, and to be the substantial mechanical equivalent of the tool therein shown and described?

A 64. Certainly.

With this clear exposition of the state of the art, and of the patentee's views of the character and scope of his alleged invention, and of his patent therefor, and of what he thought constituted the distinguishing features of his alleged invention, and of what, in his opinion, constitutes a mechanical equivalent thereof, no difficulty will be experienced in finding the Patent of February 6, 1877, to J. C. Smyth, Exhibit 14 (printed in full, with drawings, on page 117, 118, and 119, of Record), to be a full and clear anticipation. In fact, it would be impossible not to find such a machine constructed as in this Smyth Patent, to be an infringement of the Heyl Patent, according to the testimony of both the patentee Heyl and his expert, Heysinger; and necessarily the counter proposition is true, that it is an anticipation.

The construction and mode of operation of this Smyth machine, and a comparison of it with that of the Heyl patent in suit, is fully set forth in the testimony of the appellant's expert witness Brown, see Record, pages 39 to 41, Ques. 33 to 51. Apart from that, however, an examination of the patent itself is convincing that it leaves no support on which the Heyl patent can rest. While in it the clinching recess is

at the *base* of the machine and the staple inserting mechanism *above* it, this inversion of the parts, according to Heyl's testimony (see Record, page 24, Ans. 64), is a mechanical equivalent. It contains a recessed clinching hammer, precisely like Heyl's, and also a staple tube and driver, sliding with relation to each other. It contains these parts in a frame arranged opposite to each other and so that the operative parts will be guided towards each other, and so arranged that they represent opposite jaws, as Heysinger calls them, precisely as in Figs. 1, 2, and 3 of the Heyl patent; and the arm which contains the recessed clinching device is pivoted, so that if the machine was turned around, in order to make the clincher the upper arm or jaw instead of the base, it would be a fac-simile almost of the form shown in Fig. 5 of the Heyl patent. And lastly, the spring K of the Smyth patent, while it is only described as possessing the function of holding the staples, one by one in order to insert them singly, manifestly would support the end of the staple blade on or above the crown of the staple, or if the parts were reversed in position would hold up the staple tube by frictional contact precisely as the *friction* spring D^1 of the Heyl patent holds its sliding tube.

Strenuous efforts were made by the expert Heysinger on behalf of the appellees, to distinguish between the machines, but his effort was a failure. See particularly his answer to x Ques. 28, Record, page 163. It consisted mainly of objections that it was a power tool operated by a lever, and not a hand tool; but this did not make it patentably different, and Heyl had already admitted that a lever would be an *additional* feature only; also that it had several added parts to feed the staples into the tube automatically, but this did not add to or detract from its completeness as a staple driving and clinching

mechanism, in which the staples were fed singly and simultaneously driven and clinched by one operation; also that it had no knob, but it has a hand lever working the staple blade, and Heyl testified in positive and unequivocal language previously quoted, that this would not make his machine different if so constructed; also that it had no retracting spring, but Heysinger had already testified that lever machines needed none, nor would any be needed when the clincher is at the base; nor is any *retracting* spring claimed in the original or in the re-issued patent either alone or as an element of a combination; but it has a spring, K, which is truly a fac-simile of the *friction* spring, D^1, of the Heyl patent, and would operate in precisely the same manner on a reversal of the staple driver to the base of the machine; also that it was not capable of automatic adjustment to varying thicknesses of paper, but it has as much of so-called adjustment as the Figs. 1, 2 and 3 of Heyl, and precisely the same as Fig. 5 of Heyl when the parts are reversed in position and the recessed staple clinching arm is *above* the inserting device. In short, it contains every one of the same elements in precisely the same combination for the same purpose and operating in the same way—the parts being reversed in position, but that is said not to be material—with superadded parts to make it capable of self-feeding and to do heavy work, but which superadded parts do not affect in any way the principle of construction or mode of operation of the staple inserting and clinching devices, and their arrangement or combination in a frame so that they will be opposite to each other—or be opposite jaws, so-called—and the operative parts be guided towards each other with certainty in the operation of simultaneously inserting and clinching staples by a single movement. Indeed, the differences between this machine and that of Heyl are not susceptible of patentable definition.

To illustrate more fully the points made in argument the annexed cuts, on page 43 of this brief, show the Smyth machine in the various forms that Heyl and Heysinger consider equivalents of Heyl. Upper Figs. 1 and 3 is the drawing as it appears in the patent. Fig. 2 shows the same, with the position of the parts reversed. And lower Fig. 3 shows the same as Fig. 2, with the spring K acting as a *friction* spring.

If we again refer to the testimony in the cause showing the views of the patentee himself as to the scope of his patent claim, it will be impossible to sustain it in view of this prior device. Having admitted the elements to be old, and their general combination to be old, he was finally driven to rely on their union in a machine in which they were guided to each other as opposite jaws, and stated, in most positive and unequivocal terms in Ans. 24 (see Record, page 18), that the appellant's device—the Victor tool, Exhibit A—would not be the machine of the reissued patent if the rigid guide arm was omitted. Hence he considered the "guiding" feature to be the distinguishing characteristic of his device which marked its novelty; but a mere glance at the Smyth drawings disposes of that feature of alleged novelty most effectually.

Conceding, however, as we must for the sake of fairness, that Heyl (though not the first to combine these elements) was the first to put them together in a small desk tool such as McGill's (see page 86), and in so doing was the first to arrange them in such manner that the recessed clincher should be the upper arm or hammer, and that in the stapling mechanism the staple tube, and not the staple blade, should slide, so that the staple could be inserted crown downwards, and be supported temporarily until driven; he has, unfortunately for himself (in order to bring in the appellant's device), admitted that inver-

sion of the parts is a mechanical equivalent of this device. Whether he was right or wrong in that admission, either conclusion is sufficient to defeat the patent. If he was right, then Smyth shows all his elements in the same combination; but if he was wrong, then (apart from the fact that the apellant's apparatus would not be an infringement under such a view) the case presents, in view of the proven state of the art and the admissions in the testimony, the fact that the device lacks invention and patentability. As we have seen from the prior patents and the testimony quoted, the Heyl device consists of two old features, without alteration or change in their parts in any respect, and which had previously been combined before for the same purpose, and both of which the public had a full right to use separately and in other arrangements of the same combination, merely *placed* by him in the old and well-known hand-stamp; that shown in McGill's Patent of August 13, 1867 (see Record, page 86), being an exact fac-simile of that adopted by Heyl for the purpose, and shown in Figs. 1, 2, and 3 of his patent. By use of such a supporting frame or stamp, which was not novel with him, is built up the argument that his device is a desk tool; that it has opposite automatically adjustable jaws, that the parts are so guided to each other, etc., etc. His device contained none of these features, novel with him. In brief, he combined, or rather arranged together three old elements, viz.: the McGill hand-stamp, the old recessed clincher, and the old staple driver and tube [and in putting the latter on the *base* of the machine, adopted the obviously necessary *friction* spring]. In this new arrangement of staple driver and staple clincher (for he was not the first to combine them for this purpose) he did not add to, alter, or change their construction or function in the least degree; nor

did the old hand-stamp, in which he placed them, thereby undergo alteration or perform any new function, nor did the union of all three affect, alter, or change the separate function of each.

Place them side by side (see cut annexed, on page 44 of this brief, in which the lower figures represent Heyl's, while the three upper figures represent respectively the McGill stamp, the Tomlinson staple driver, and the old recessed clinching anvil), and the illustration thus given fully supports the argument.

The case thus presents facts precisely like those on this point in Saxby *vs.* Gloucester Wagon Co., 7 Queen's Bench Div. 305, cited in Gardner *vs.* Hertz, 118 U. S. 180; and is controlled by the decisions in the latter case, as well as by Thatcher *vs.* Burtis, 121 U. S., 286, which is a parallel case; and see also Pomace Holder Co. *vs.* Ferguson, 119 U. S., 335; Thompson *vs.* Boissolier, 114 U. S., 1, and Yale Lock Co. *vs.* Greenleaf, 117 U. S., 554.

2. *The construction to be given to the Patent if sustained, as respects the question of infringement.*

If it is possible to sustain this patent for any purpose, it must necessarily be for the precise device shown in the drawings and described in the specification. Not only because of the state of the art, as it has been shown, but because of the language of the description and claims of the patent itself. The invention involved in Bragg *vs.* Fitch, 121 U. S., 484, is an illustration of the point made. There the state of the art

required the claim to be limited to the "precise form and arrangement of parts described in the specification, and to the purpose indicated therein," because that particular form and arrangement was essential to all the beneficial use of the device.

In Snow *vs.* Railway Company, 121 U. S., 629, the claim was limited to a device having the peculiarities described in the specification,—though there were no qualifying words in the claim confining it to such,—because by the description the patentee had made such arrangement material.

So, also, in Thompson *vs.* Boissolier, 114 U. S., 18, the question of infringement of the Bartholomew patent turned on the location of one of the parts, and the claim defining this part as above or over another, and not beneath it, was limited accordingly, the Court saying that "the limitation imposed by the patentee must be presumed to have been made with good reason."

In the case at bar the language of the claims in question (one and two of the re-issue) is such that it is impossible to construe them to cover the appellant's "Victor" tool (shown in Brown's patent, see Record, page 161) without doing violence to their plain meaning and import. It is not a question of whether they are or are not coextensive with the thing *described* in the specification; but what does the plain meaning of the words of the *claim* imply? If this is the law, how can claim 1 be said to cover a device with a stationary recessed clincher when the claim calls expressly for a "reciprocating" clincher; nor a movable and detached staple-inserting device when the claim calls for a "stationary" staple supporting anvil or driving blade. Indeed, how can the claim be sustained at all, in view of the want of novelty of both the *elements* claimed, whether separate or in combination, unless

the supporting frame also is included as an element of the combination by implication from the words "substantially as and for the purpose set forth." If the *frame* is not so included, and the *arrangement* of the parts therein, *as shown*, is not the thing patented, then the words of the claim are broad enough to cover the prior Smyth patented machine, and the patent would be thereby necessarily defeated. See Washing Machine Company *vs.* Tool Company, 20 Wall., page 351. So in claim 2, in the combination therein claimed the elements are specifically mentioned and ear-marked by letters of reference, and are so claimed when "the whole (are) arranged to operate substantially as and for the purpose set forth," which, of course, impliedly includes the frame in which they are "so arranged," and in which they may "operate substantially as and for the purpose set forth." (See Hill *vs.* Sawyer on "frame" as an element, 31 Fed. Rep.)

It is too well settled at this time to be disputed, that if these quoted words are words of limitation, confining the claims to the thing described, the patentee is bound by them whether the claims are coextensive with the thing described in the body of the specification or not. Keystone Bridge Company *vs.* Phœnix Iron Company, 95 U. S., 274. The claims must be construed and limited by the plain meaning of their words, where there is no ambiguity or doubt, and without resort to the specification, except to better understand their meaning, but never for the purpose of enlarging or changing the meaning or scope of such words. White *vs.* Dunbar, 119 U. S., 47.

And this fact appears on the Record, which is all-important in ascertaining and defining the scope of these claims. A reference to the file and contents of the application for this Re-issued Patent, shows that these and other similar words

importing a stationary staple blade and a reciprocating clinching device, were inserted in consequence of the objection, by the Examiner, to their omission in the specification as first filed; the whole tenor of the re-issue specification, as originally filed, showing an unsuccessful attempt to describe and claim in express language the forms of device, such as appellant's "Victor" tool, which it is now sought to bring within these claims by a broad interpretation and which the Patent Office refused to accept or allow to be expressed in words which would give color to such an interpretation.

Such objections by the Patent Office, and such amendments made in consequence thereof by the patentee pending his application for the patent, this Court has frequently said, should be decisive on a question of construction of the claim as finally allowed. Sutter *vs.* Robinson, 119 U. S., 541, citing Shepard *vs.* Carrigan, 116 U. S., 593.

(3) *The Original and the Re-issued Patents, and a comparison of them.*

The Original Patent to Heyl was granted September 25, 1877. The Re-issue is dated July 12, 1881. The exclusive license to the appellees is dated February 7, 1881, and confirmed by an assignment dated November 23, 1881. The application for the Re-issue in suit was filed May 10, 1881, three years and eight months after the date of the Original; and the Re-issue application papers were prepared by one of the licensees—Mr. Isaac W. Heysinger—acting therein as at-

torney for the applicant; the same gentleman afterwards appearing as one of the plaintiffs below in this suit, and also as the principal expert witness in their behalf. These and other collateral facts throw considerable light on several branches of the issues and inquiries involved in this suit. They show (1) that Heyl did not consider either the appellant's "Victor" tool, Exhibit A, or the appellee's "Novelty" tool, Exhibit C, both of which are alike as he says, to have been an infringement of his Original Patent; see his 53d, 54th, 56th, and 57th answers, Record, page 23. (2) That Heysinger, after stating (see Record, page 161, Ans. 18 and 19) that he rested entirely on the fourth claim of the Original, admitted that the only defect in the Original was not in the description but in the claim (see Ans. 21, Record, page 162); and that the *first* claim of the Re-issue was intended to cover and does cover, as he says, the entire invention which was properly the subject of the Original Patent (see Heysinger's 25th Ans., Record, page 162). (3) That the appellees did not acquire any license under this Heyl Patent until after they brought out their "Novelty" tool, Exhibit C (see their patent for it, dated April 13, 1880, Record, pages 119 and 120); and this is the tool that Heyl said was like appellant's tool, and both of which he did not think infringed his Original Patent (see his 54th and 57th Answers, above referred); that this Exhibit C was excluded from the payment of royalty under the license from Heyl to the appellees (see Heysinger's x Ques. 16, Record, page 13); and lastly, Heysinger's unqualified admission that the Original Patent did not cover such devices as his own and the appellants; see conclusion of the 26th Answer, Record, page 14, wherein he says: "After we had once satisfied ourselves that it could be re-issued against us, if held by others, it was our

obvious right and duty on securing control of it to protect the invention which it was desired to cover, but did not." (4) That the only defect in the Original Patent (according to Heysinger's testimony), was the omission of the "sliding guide" as an element of the combination claimed. (See Heysinger's Answer 19, Record, page 161.

As we have seen, the original patent contained four claims, all of which were abandoned but the fourth (see Ans. 18 and 19, Record, page 161). The re-issue contains eight claims, of which the first is substantially the same as the fourth of the original patents, properly amended by inserting the sliding guide or staple tube, and which Heysinger admitted (Ans. 25, Record, p. 162) covered the essence of the invention and all of the claims of the original. "The others (he said in same answer) are specific descriptions of what is necessary and proper to make it a good tool of the kind." These "others" are the fifth and seventh (which are not only old, but are not involved in this controversy), and the second, third, fourth, fifth, sixth, and eighth, all of which are stripped of all the qualifying and limiting words of the Original Patent, and are such manifest enlargements of the Original Patent and wholly beyond even the statement of invention in the specification, that they were all, except the first and second claims, excluded from consideration by the Court; these two alone forming the basis of the decree, the injunction order being expressly confined to them.

A reference to the file and contents of the application for this Re-issued Patent discloses some very interesting facts. The oath to the application (see Record, pages 63 and 66, folio, 108) assigns no less than seven reasons why the Original Patent was defective. With the exception of one, which is a

disclaimer in form, and is not true, for the subject was not *claimed* in the original, all the others relate to alleged defects in the claims, but aver no errors elsewhere in the patent. These alleged inadvertently-omitted subjects of claim include every elemental feature afterwards found in the last seven claims of the Re-issue. The oath further says that "no claim for which was ever made by the above named petitioner." There is an entire absence, either in this oath or in the petition, of any reason why the application for Re-issue was delayed for nearly four years; and as has been seen by this record of the application itself, the only true and sole reason for the Re-issue was to cover and claim something which the original did not cover and claim; and which "something" was the "Novelty" and "Victor" tools; and both of which devices, as we have also seen, the patentee himself, as well as the appellee and witness Heysinger, have admitted (see Heyl Ans. 54, 57, Record, page 23, and Heysinger Ques. 26, Record, page 14), were not covered and claimed thereby.

The record and proof therefore show a bar by reason of laches, from asserting anything by reason of this re-issue beyond the matter of the first claim only (which is substantially the same as the fourth claim of the original). Miller vs. Brass Co., 104 U. S., 350; Mahn vs. Harwood, 112 U. S., 354; Wollensak vs. Reiher, 115 U. S., 99; Ives vs. Sargent, 119 U. S. 652. And the seven remaining claims thus excluded are further avoided because they render the patent *pro tanto* a patent for a different invention from that for which the original was granted or intended to secure. There can be no dispute upon this point; the error of the Court below being that it saved not the first claim only, but the second also, and concluded by giving such a broad interpretation to both as to prac-

tically sustain the whole. This was clear error; the second claim was open to the objection that it was enlarged by having all qualifying words of the original fourth claim eliminated from it, and it is precisely the same as the first claim, with the exception of these qualifying and limiting words. The Court seemed to have failed to notice this, notwithstanding it was part of the proofs by Heysinger's own admission. See Record, pages 161 and 162, wherein he says:

X Q 21. "*Then, if I understand you correctly, the descriptive parts of the specification of the original were full, clear, and perfect, but the defect, in your opinion, if any there was, resided in the claims only. Is that so?*

A 21. In its essence or substance, yes.

X Q 25. You have said that the original specification, in the descriptive parts was full and sufficient to enable any skilled mechanic to make the machine in all its features; that is described in both the Original and Reissued Patents. The effective purpose then, of the surrender and reissue, was simply to enlarge the claims in the features wherein you considered them insufficient or inoperative. Is that so?

A 25. The claims were not enlarged in substance. They are all contained in the subject-matter of the first claim of the reissue. The others are specific descriptions of what is necessary and proper to make it a good tool of the kind. I do not consider the reissue broader than the original, though it is less likely to provoke controversy and produce litigation, by being more clearly set forth."

And yet the final part of this answer (in rebuttal) contradicts not only Heyl (who has admitted in testimony quoted that the Original Patent did *not* cover the appellants' tool), but also contradicts his own testimony in the *prima facie* proof

(see Record, page 14, end of Ans. 26), wherein he admits the same thing. Indeed, it needs no parol testimony to prove that Claim 2 is an enlarged claim; a comparison of it with Claim 1 is enough to show it. They are both alike, saving only that the second omits the qualifying words "stationary," "sliding," and "support;" for while the first mentions a *sliding* guide but not a spring, the second mentions the spring specifically, yet the first, in describing the guide as *sliding*, necessarily includes, by implication, the described feature to make it so operate—viz., the spring. If, therefore, the second claim is not a mere duplication or repetition of the first, it must mean something else or something more than the thing claimed in the first, and was so construed by the Court below, who found, in effect, that it meant a device which was not that of the fourth claim of the Original Patent, and the first claim of the Re-issue—viz., a tool composed of a "stationary" staple "*support*" or driver operating in a sliding staple guide, and a "reciprocating" hammer or clincher; but that it included devices such as appellants, which had no *reciprocating* clinching arm, nor any *sliding* guide, nor any *stationary* or *supporting* staple driver. Of course, Claim 2, by the omission of these qualifying words "stationary," "sliding," "support," is a manifest enlargement of the Original Patent and its claims, otherwise it would be simply impossible to construe it to mean anything more than the matter of the first claim, and as a repetition thereof, which would be absurd. It was intended to be, and is (and the whole record of the application for the patent and the proofs in the cause clearly support the charge), a cunning selection of words that could be plausibly interpreted to mean something other and more than and different from what was either described in the specification or

included in the claims of the Original Patent; and was so used successfully in the Court below to the manifest prejudice and injury of the appellant.

(4) *Errors in the Master's Report and the Decree based thereon.*

The error underlying the theory on which the Master found damages against the appellant (in the absence of proofs of profits or gains) is, that he compared the "Victor" tool made and sold by appellant, not with the "Heyl" tool of the patent (Exhibit B), which the appellees made and sold under the license, but with the "Novelty" tool (Exhibit C), which the appellees also made and sold, and for which they paid no royalty to Heyl. There was not the slightest evidence in the cause that appellant's sales interfered with the sales of the Heyl tool (Exhibit B); and there was no evidence, even with this erroneous comparison of devices, that the appellees were in any manner injured or affected by the appellants' sales, or that they could or would have sold a single implement of any kind to any of appellant's customers. Nor was there a scintilla of evidence that the profit or gain on the "Novelty" tool, which was taken as a basis to compute the damages, was in any manner due to the patented feature. The record is barren of any proof on which a substantial award could properly or legally be founded. The exceptions to these findings taken in the Court below, and overruled by the decree, are embraced in the ninth, tenth and eleventh assignments of error.

In conclusion, it is earnestly urged that upon the whole case as presented in the Record, both the interlocutory and final decrees entered by the Circuit Court were erroneous, and should be reversed with costs.

H. T. FENTON,

Counsel for Appellant.

Smyth
Patent 187.189.

Fig 1

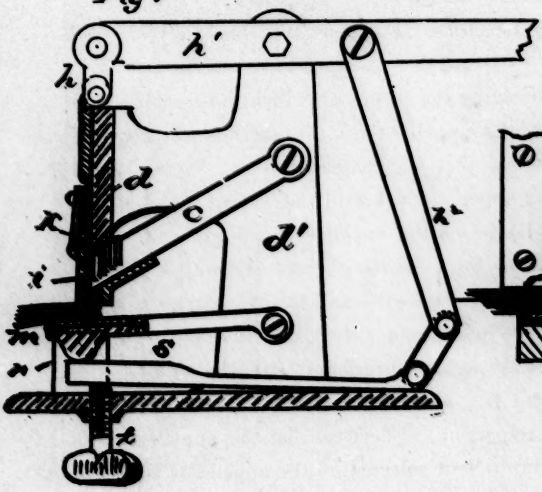


Fig 8.

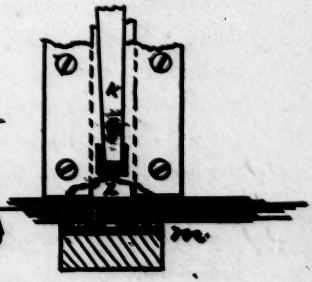
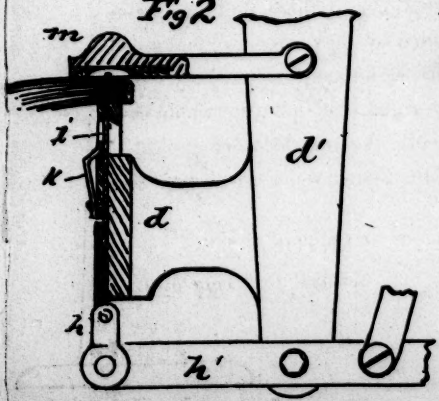


Fig. 1.

Fig 2



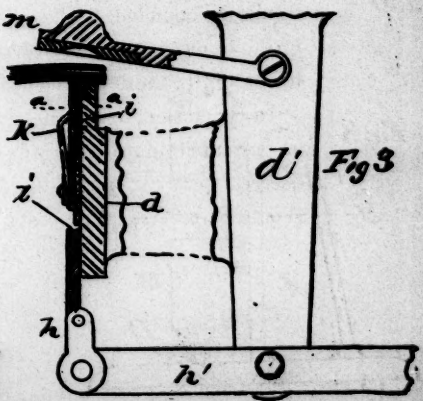


Fig 3

McGill.
Patent No 67.665

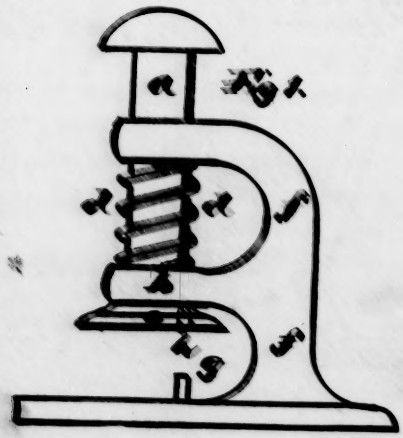


Fig 1.

Tomlinson.
Patent
No 132.221.

Pat. No 187.189.
Smyth

Heyl.
Patent No 195.603.

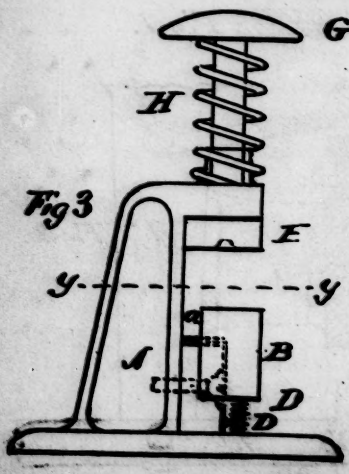
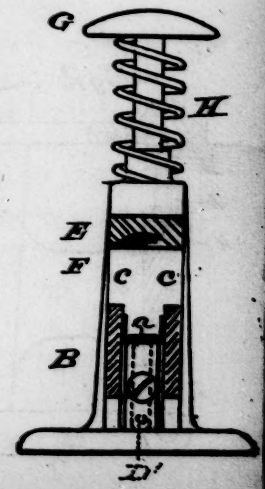


Fig 3

Fig. 4.



McGill.
Patent No 67,665

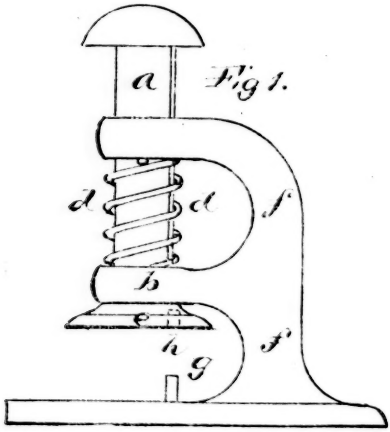
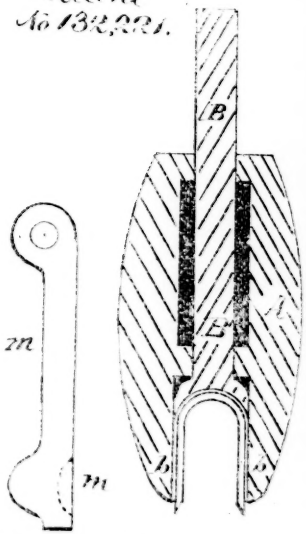


Fig 1.

Tomlinson.
Patent
No 132,221.



Pat No 187,189.
Smyth

Heyl.
Patent No 195,603.

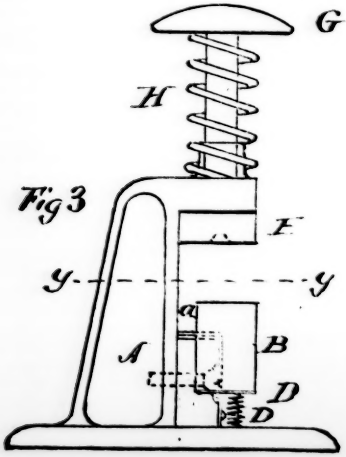


Fig 3

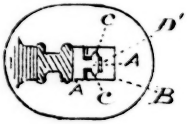
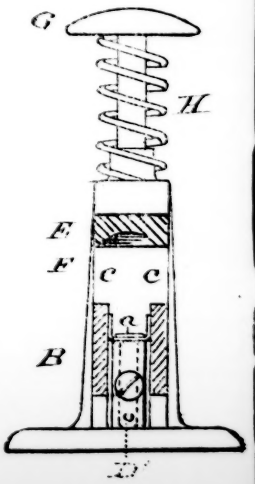


Fig 4



U-589

FILED
NOV 8 1887

IN THE

Supreme Court of the United States.

No. 82. October Term, 1887.

JAMES P. CRAWFORD,
APPELLANT.

vs.

ISAAC W. HEYSINGER, et al.,
APPELLEES.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF PENNSYLVANIA.

BRIEF FOR APPELLEES.

JOSHUA PUSEY,
Counsel for Appellees.

PHILADELPHIA:
DUNLAP & CLARKE, PRINTERS AND BINDERS, 20-24 SOUTH 3RD ST.
1887.

IN THE

Supreme Court of the United States.

JAMES P. CRAWFORD,
Appellant,

vs.

ISAAC W. HEYSINGER, CHRISTIAN H. HERSHEY, and J. LOREN HEYSINGER, trading as the PHILADELPHIA NOVELTY MANUFACTURING COMPANY,
Appellees.

October Term, 1887,

No. 82.

Appeal from the Circuit Court of the United States for the Eastern District of Pennsylvania.

BRIEF FOR APPELLEES.

Hereinafter are considered—

1. The nature, purposes and advantages of the Heyl Invention.
2. Validity of the Heyl Re-issue.
3. The state of the art prior to the Heyl Invention.
4. Infringement by the defendant's implement of the Heyl Re-issue.
5. The decree for damages.

Nature, Purposes and Advantages of the Heyl Invention.

As the testimony and exhibits show, costly, complicated and cumbersome machines of various constructions were patented prior to September 25, 1887, the date of Heyl's original Letters Patent, which machines were designed and adapted for inserting and clinching wire staples in books, pamphlets and paper boxes; for example, such machines as are shown in the Heyl patents, pages 97 and 100 of the printed record, the Heyl & Brehmer patent, page 108, and the J. C. Smyth patent, page 117.

Excepting the said Smyth machine (to be hereinafter considered at length) which automatically delivered the staples of uniform size into the side of the driver-case or channel, these machines made their own staples just previous to driving the same.

There were also patented, prior to the Heyl machine of 1877, various styles of devices for driving staples in blinds, barrel-hoops, etc., such as those described in the Betts patent, page 83, the Tomlinson patent, page 85, and the D. M. Smyth patent, between pages 82 and 83, upon which the J. C. Smyth invention is an improvement.

There were also patented machines for setting button-hooks, such as described in the Esser & Steere patent, page 87, the Bradford patent, page 89, and the Palmer patent, page 148.

These various machines show the state of the art previous to the Heyl invention, and they show clearly, by comparison, the novelty and utility of the Heyl device, as described in his original Letters Patent, No. 195,603, of September 25, 1877, and the Re-issue patent, No. 9,803, of July 12, 1881, pages 81 and 27. respectively, of the record.

It may be here observed that Heyl was a pioneer inventor of that class of machines for binding together the sheets of books and pamphlets by means of wire-staples that were driven through the paper and clinched by means of devices co-

acting to that end as described in the Heyl patents, and the Heyl & Brehmer patents of 1872, 1875 and 1876, appearing in the record, but these machines were designed for special heavy work in book-binding establishments. There was then no hand machine adapted for general or miscellaneous use by the public, especially by lawyers, conveyancers and others, for stapling together a number of sheets that were continually varying. Heyl, sagaciously observing that either there was a demand for such a convenient and useful implement or that a demand therefor might be created, devised in the year 1877 the desk or hand-stamp implement, which is the subject of the patent here in question, which has come into extensive use, and which, it may be observed, by the patents issued subsequent to the Heyl patent (put in evidence by the defendant below and appearing in the record) has led to a number of imitations and improvements in details all embodying the essential elements and mode of operation of the Heyl tool.

What are the nature and functions of this tool?

As generally stated in Heyl's original and in his Re-issue Patent, it "consists of an implement in the form of a hand-stamp by which metallic staples may be forced through sheets of paper documents and secured by clinching the legs on the reverse side."

Two forms of the device are shown in the drawings, the one in which the upper jaw reciprocates in a straight vertical line and the other in which the jaw is pivoted. The mechanism consists of two opposite jaws, movable to and from each other, and accurately guided, one jaw being provided with a groove or concave recess, adapted to bend the legs of the staples together when forced against the sides of said recess; the other jaw being provided with the staple-inserting mechanism. The latter consists of a longitudinal staple-guiding channel fitted to embrace the sides or legs of the staple, and movable under spring pressure upon an anvil or plunger contained in said staple-guiding channel, and operating against the top or crown of the staple from behind to force it forward out of the staple-

guiding channel, and thus force the points of the staple legs into and against the sloping sides of the aforesaid recess when the jaws are brought forcibly together. These jaws are so guided as seen in both forms of the device, Figures 1 and 5 of the patent, that when brought into opposition the points of the staple legs as they emerge from the staple-guiding channel, will be simultaneously bent inward by the recess and brought together *by the continuous approach of the jaws under pressure.*

As shown and described in the patent the implement is adapted to drive the staples with their points directed upwards, but it is obvious that, by simply inverting the device upon a table, the staples will be driven downwards. This latter form is that used by the defendant in what he terms his "Victor" tool.

When a staple is properly inserted in the end of the staple-guide (which is done when the jaws are in their normal position, that is, standing wide apart), and the sheets of paper to be bound together are placed between the jaws, and the latter are brought together so as to clasp the body of papers, and a smart blow is then given upon the knob, the staple will be driven through the paper sheets, and clinched on the reverse side by the action of the clinching recess. It will be observed that in this way, using staples of suitable length, any number of sheets of paper may be thus bound together—say from two or three to fifty or more. And it will be further observed that the machine automatically and instantly adapts itself to the thickness of the body of sheets of paper which, in practice, is continually varying. This automatic action, requiring no adjustment, is the important feature of the Heyl machine which mainly distinguishes it from all other preceding machines. And the new element, in combination with the old ones, which enabled Mr. Heyl to accomplish such result is "the sliding-staple guide B": that is to say, a guide which is adapted to move with relation to the anvil (or driver), and the part having the clinching recess.

It will be understood that in order to drive the staple through the body of paper, it is necessary that the latter shall be held against the open end of the staple-guide; for if there be a space between, the staples will buckle up or bend without penetrating the paper, or its legs will not pass through to the clinching recess.

The staples having been driven and clinched, as previously described, the mere opening of the jaws by a spring or otherwise, releases the papers, and the device is ready to receive another staple.

In this Heyl device the construction is such that the staples are to be inserted singly, as the length of the legs of the staples must obviously vary within certain limits, according to the thickness of the body of papers to be bound together.

It is clear that a tool of this character is useful for a number of miscellaneous purposes for which large complicated machines, having a fixed adjustment for large editions of pamphlets, etc., of the same size, and using staples of a uniform length, would be of no practical value.

In the several patents granted for stapling machines for desk or miscellaneous use since the Heyl Patent, such as to McGill (who is a licensee under the Heyl Patent), of October 28, 1879 (p. 129), and of February 18, 1879 (p. 135), to Somers, February 26, 1878 (p. 142), to Brown, August 5, 1879 (p. 149), to Heysinger, April 13, 1880 (p. 120), and others, is embodied the same elements in a similar combination, and adapted to operate in substantially the same manner, with like results, as the Heyl machine, and are improvements or alleged improvements upon that machine, which testify to its utility.

VALIDITY OF THE HEYL RE-ISSUE PATENT.

The claims of the re-issue considered by the Circuit Court were the first and second.

The drawings of the re-issue, and the original patent of September 25, 1877, are identical, and the specifications

are substantially the same, except that the means of flattening the staple legs close against the paper, by means of a second blow between plane surfaces, was in the re-issue disclaimed as a part of the invention, the patentee having discovered that that feature was not novel.

There were four claims in the original patent, the first and second of which related to the flat surfaces for giving a second blow, which claims were omitted from the re-issue.

The third claim was for a sliding staple guide B grooved to partially embrace and guide the staple legs in combination with a stationary anvil or staple support working therein. This claim appears in the re-issue as the seventh claim.

The fourth claim of the original patent was apparently designed to cover broadly the essential operative combination of sliding staple guide B recessed clincher, reciprocating jaws, anvil moving with relation to said staple guide, all co-acting to insert a staple through layers of stock to be united and simultaneously bend over its projecting ends, the layers of stock being "sheets of paper documents."

There was, however, inadvertently omitted from the 4th claim an essential element of the combination, to wit: the "sliding staple guide B;" therefore, the claim was for a combination that was inoperative to accomplish the object and functions of the invention clearly described in the specification.

In the 1st claim of the re-issue this deficiency is supplied.

Claim 2 of the re-issue recites the same elements as claim 1, and adds the two limiting elements of the spring "D" and knob "G." It therefore appears that the re-issue is (so far at least as pertains to the claims under consideration) for the same invention as the original.

AS TO THE STATE OF THE ART PRIOR TO THE HEYL INVENTION.

None of the several patents put in evidence by the defendant below, anticipate the Heyl invention. In fact, none have

been urged as in anticipation excepting, perhaps, the J. L. Smyth Patent, No. 187,189, of February 6, 1887, page 117 of the Record, which patent will be considered at length further on.

Taking up these patents in the order in which they appear in the Record, the first is that of D. M. Smyth (drawing between pages 82 and 83), for a machine for wiring blinds. It consists merely of a sloping table and bar, down which the staples run, and are driven through a fixed guide into wooden blind slats. No clincher is used, and no clinching is done or required.

The BETTS Patent, No. 56,884, of August 7, 1866 (p. 83), for tool for holding and driving staples for wire fences. The device consists of a self-feeder, to be held in the hand, and adapted to drive staples into fence posts, etc. It has no clincher, no base, and has a fixed staple guide.

The Tomlinson Patent, No. 132,221, of October 15, 1872 (p. 85), for improvement in devices for driving staples. It is a simple staple driver held in the hand, without a base, guide-arm, or clincher, and lacks other of the distinguishing elements of the Heyl implement.

The hoops to be stapled are placed upon an iron mandrel, which is apparently merely a bar or block beneath the hoop, and the clinching is done by crushing the legs of the staple into the wood, just as hammered nails are sometimes clinched by a metal block held on the opposite side.

The MCGILL Patent, No. 67,665, of August 13, 1867 (p. 86), for press for attaching paper fasteners. This is simply a device for punching holes or slits in paper, and with a flat face under the driving head for spreading the legs of a peculiar T-shaped fastener, known as the "McGill fastener." After the slit is punched in the papers by the stud g, the papers are removed from the stud, one of the T fasteners is inserted in the slit by the fingers, the legs of the T are spread apart, and the papers then again laid on the flat surface under

the head and flattened down by a second blow. This machine has no staple guide, no clinching recess, no anvil or plunger.

The Esser & Steere Patent, No. 78,077, of May 19, 1868 (p. 87), for machine for setting button hooks.

This is a device in the form of hand pliers, the object of which is to insert the prongs of a "combined hook and button, which is described and shown in the letters patent of Wm. H. Shurtleff, of Providence, Rhode Island, dated June 5, 1866." It consists of a pair of jaws, one being a triangularly shaped prismatic block, revolving on trunnions and presenting different faces as the jaws are successively closed and opened, these faces having holes and recesses to complete the crushing down of the prongs. The combined hook and button is of a well-known form, and has an enlarged head, and on a curve below a set of three prongs, all made of a single piece, and the prongs being stiff enough to thrust through leather without bending when the sides are unsupported. In using the device the "combined hook and button" is slipped into a slot in the jaw, and the prongs project toward the other jaw when brought together, the prongs are forced through and pass down into three vertical holes, opening and closing the jaws again brings a new face of the mandrel opposite the prongs which are now bent partially, and a third opening and closing of the jaws buries these recurved prongs into the leather, which is then removed, pulling the neck of the button out of its slot in the other jaw. As the head of the button is necessarily larger than the prongs (or else the slot in the jaw would not hold it), it is clear that no sliding or other staple guide can be used, as the legs could not be guided down a channel when the head of the button was descending through the same channel immediately behind. As a matter of fact, there is no staple guide used, the prongs strutting forward into the air, and so remaining through the whole operation. No wire staple could be held or driven through a resisting substance in this way, as wire staples require to be securely held in a closely-fitting staple-guiding channel while the legs are being forced through

the paper and into the clincher, otherwise the staple behind will buckle up, being made simply of wire, as shown in figure 6 of Heyl's Reissue Patent. Moreover, the Esser & Steere device does not fulfil the conditions of Heyl's first claim, which provides for mechanism "operating to insert a staple through layers of stock to be united, and simultaneously bend over its projecting ends," since the Esser & Steere tool first inserts the prongs through the material and projects them straight forward from the opposite side; then the opening and closing of the jaws a second time is required to even partly bend the prongs, and a third operation completes it. The inserting and bending do not occur simultaneously—by the Esser & Steere tool—as the insertion has been fully accomplished by the first closing, and the bending alone is accomplished by the second and third closing. Besides, the purpose is different, for the Heyl tool fastens "sheets of paper" together, while the Esser & Steere tool merely attaches a button to the upper side, there being but a single piece of leather and no fastening together being required.

The BRADFORD Patent, November 7, 1871 (p. 89), for tool for setting button hooks. This is similar to the Esser & Steere, except in the device for holding the button hooks. In this invention there is a rod under the button-holding jaw, extending forward and connected with a stud having an upper blade d, longitudinally slotted in the middle, a retracting spring h, carries the rod and stud backwards. The button hook itself is shown in Fig. 4. To operate this, the rod D is pushed forward from behind against the tension of the spring h, moving the stud C, with its slotted blade d, forward, and opening the little chamber in which the head, or button part of the hook lies while being driven. The hook being inserted, with its head in this chamber and legs projecting above, the hook part of the button presenting forward when pressure is released from the rod D, the stud C moves back against the button, and the blade d enters the hook part under the button head, and prevents pressure from jamming the base of the button or

hook back against the head. The prongs project upward in the air, and are guided solely by their own rigidity. It is as though a wire staple were grasped at the crown by a pair of nippers, and it were endeavored to force it through a mass of papers. There is no staple guide shown or used in the Bradford patent, sliding or otherwise, and all above remarked of the Esser & Steere tool will apply to this.

So also of the PALMER Patent, of 1869, (page 148). This is for setting button hooks, and in Fig. 3, one of the said hooks is shown, with prongs projecting, ready for insertion in the leather. The crushing of the prongs is done by a block h, pushed to and fro, to bend the legs by a second operation. No staple guide, sliding or otherwise, is used, and the tool would not serve the purposes of the Heyl tool, nor drive staples suitable for such use.

The HEYL and BREHMER and the HEYL patents (contained between pages 90 and 117), are all power machines of a complicated and expensive character. The clinching is done by independent mechanism, worked by a special train of machinery, and the staples are made from spools of wire in the machine. These machines differ widely from the implement of the Heyl patent involved in this case, and are fully explained in the testimony of the inventor, Henry R. Heyl, (see ans. 25 to 42, pages 18, 19, 20 and 21 of Record).

The J. C. SMYTH patent, No. 187,189, of February 6, 1877 (p. 118), for machine for stitching books with staples.

It may be remarked that this machine, as described and illustrated in the drawings of the patent, is inoperative. In this the complainant's expert, Heysinger (p. 158, folio 231), and the defendants' expert, Brown (top of p. 57), agree. It may also be here observed, as is further remarked in the opinion of the Circuit Court (p. 164), that in a suit against Brown brought and determined before the present suit, he did not think it worth while to set up the Smyth machine as an anticipation of the Heyl patent, although he was then familiar with it.

The Smyth drawing shows a machine which is inoperative in the mechanism for withdrawing and moving forward the bar S, as stated in the specification. "Beneath this die M, there is a wedge plate S, that is moved endwise by an arm h^2, from the lever h^1, that is linked to said plate S, so that the latter slides endwise as the lever h^1 is raised and depressed." S is not a wedge-shaped plate but a plate having its upper and under faces parallel with each other, and the motion of the lever h^1, by raising and lowering it, would not move the plate S either forward or backward under the die M. If, however, the vertical rod h^2 be rigidly attached to h^1, then it will act as an elbow lever through the small link connection below, and pull or push the plate S in or out as the bar h^1 is raised or lowered. And if the upper and under surfaces of S be changed so that they will form the surfaces of a wedge enlarged toward the front, then the bringing up of the rear end of the lever h^1, will (if the whole device be firmly attached to a bench or table so as not to be lifted up behind and tilted forward), through the rigid arm h^2, draw back the plate S and the interposed metal, between the die M above and the screw t beneath, growing thicker as the wedge retreats, will raise the die M against the lower end of the "head block d," and, at the same time, the forward end of the lever h^1, acting through the link h, will force down the plunger in the head block, and drive the staple against the die M, which is made with a recessed face." An examination of the drawing will show that, as the motion of the plunger, which rises sufficiently to have a staple to slip under it, from the inclined bar C, must, in order to receive the staple above and eject it below, always have the same length of reciprocation from the point where it receives the staple beneath it to the lower end of the head block. Hence the sweep of the lever h^1, pivoted at the centre to the frame of the machine must also be the same, and the forward and rearward motion of the plate s between the screw t and the die-block m. Consequently, the lift and drop of the die m, pivoted by a rearward extension to the frame of the machine,

so as to rise and fall, will always be the same,—that is, if the difference in the thickness of the wedge from front to rear upon its bearing surfaces be a quarter of an inch, then the die m will rise a quarter of an inch, and this rise and fall of a quarter of an inch will be constant for every complete reciprocation of the lever h'. Now, if the drop of the die plate m be one-fourth of an inch only from the lower end of the head block d, when the plate s is projected forward and the plunger i is raised, then when the plunger is brought down the die m will be in exact contact with the under side of the head block. Suppose, now, a pamphlet or number of sheets of paper be interposed between the die m and the under side of head block d when the plunger is raised. On bringing down the plunger, by raising the rear end of the lever h', before the plunger had reached the bottom of the channelled head block d, the die would be choked against the mass of papers and the staple could not be driven. To give the requisite space the screw t would be brought into service, and, being rotated backwards, would so screw down the wedge plate s, which rests upon the top of t, that the space between the top of the die-plate m, which rests in turn upon the plate s and the lower end of the head block d, would be enlarged; and if the screw t be turned just enough and no more, then the plunger, when brought down to the lower end of the channelled head block d, would have ejected the staple, which would be driven and clinched. But what guide is there for this rotation of the screw? Smyth says, in his specification, "It is important that the book or pamphlet be pressed firmly against the under edge of the head block, so that the staples will be guided in their channel while being driven." It is well known that some papers are very compressible and soft, others very hard and resistant. Shall the screw be turned just the thickness of the papers backward, or how shall it be regulated? The specification merely says, "and in order to adapt the machine to different thickness of books or pamplets, the screw t is provided, beneath the wedge plate s, to raise or

lcwer that and the die m." It is obvious that since the rise and fall of the die m is the same for every motion of the machine that this is only the amount required to release the book from the jaws and allow another to be inserted, in case uniform thickness be used, as, for instance, in stapling up an edition of pamphlets in a book-bindery. In that case, since all the pamphlets are alike, the screw t being set in the morning, the machine will work off the edition without variation of parts. But for miscellaneous work on "sheets of paper," for which the Heyl tool is adapted, it is clear that the Smyth machine would not operate successfully in a practical sense, since the screw t would have to be brought into play for every operation of stapling, and the distance of the die from the lower edge of the head block d would always be a matter of chance, since the die m could not be brought up to test the distance, for, by so doing, a staple would be brought down and thrust against the die m. Nor could the papers be first introduced between the die m and the lower edge of the head block and the screw t be then screwed up to make a tight fit, for when the die is brought up the plunger is brought down and (the machine being a self-feeder) a staple would be forced out before the screw t could be brought into use, and, as Smyth says, it is "important that the book or pamphlet be pressed firmly against the under edge of the head block," the staple would be driven before there was any compression, and it would be buckled up against the papers by want of support of the staple, and the screw t could not be brought up by reason of the presence of the bent staple under the plunger, or else the staple having been already driven, there would be no use in operating the screw t at all in that case.

What the Smyth machine requires to make it serve the miscellaneous purposes of the Heyl tool, and to serve as an anticipation in any respect, is *the sliding staple guide*. That is, referring to the Smyth drawing, if the channelled head block d, in which the staples are guided, and in which the plunger i works, were made to reciprocate vertically upon the

frame d^1, with reference to the die m, and if this reciprocation were limited to an inch, say, and a spring were used in the head block to act against a shoulder of the plunger and retract the said plunger in the channel of the said head block, then it is obvious that when the plunger was raised it would first carry up the plunger in the head block to the limit of the spring, and when this limit was reached the plunger would then raise the head block itself, thus lifting the head block from die m, and opening a space for a pamphlet, thick or thin, or a number of sheets of paper, few or many. Reversing the operation, when the front end of h^1 was brought down, and with it the plunger i, it would carry down with it the vertically movable head block d, by the force of a contained spring, until the lower edge of d rested upon the top surface of the pamphlet or papers. The downward descent of the head block would now cease, and the plunger descending through the channel would drive the staple and clinch its legs in the recess of the die m, the downward movement of the plunger compressing the spring in the head block and clamping the papers with whole force due to compression of the said spring. It is obvious that no regulation would be required, the whole being automatic, and suiting itself upon every occasion to the thickness or thinness of the papers to be stapled. This is the method and the mechanism substantially used by Heyl, and by the defendant, but nothing of the sort is found in the Smyth patent. It is, in fact, excluded, for with this sliding staple guide and retracting spring added (both acting as shown in the Heyl patent) the whole mechanism of Smyth below the die m would be rendered useless. The wedge plate s disappears, and with it the screw t, the link at the rear of the plate s, and the elbow lever h^2. The whole train shown in the Smyth patent from the top lever h^1, around the rear, and down to the under part of the machines, is abandoned. The machine now has a new base. The die m is enlarged, and becomes the permanent base of the machine from which rises the support d^1, rigidly attached thereto. To the upper part of this

the guide arm extends forward over the die m, and to the edge of this guide arm is attached the vertically reciprocating channelled head block, containing the plunger i, acting against the lower side of the head block by a retracting spring. To the upper end of the plunger i, a hand knob is attached, and, lo! the device shown in Heyl's Fig. 1, is substantially apparent. But in the process the Smyth tool has disappeared; distinctive parts have been dispensed with, the novel elements of the Heyl tool have been supplied to take their place, and the metamorphosis is complete. The defendant would ask the Court to take this metamorphosis for granted, but as the Circuit Court says: "It is true that the Smyth machine, when stripped of various parts, and altered in others, bears some resemblance to Heyl's. These alterations, however, produce a new machine, evidently not discovered by Smyth."

To corroborate this view of the court, reference should be made to the aforementioned D. M. Smyth's patent of 1864. J. C. Smyth says, in his patent: "In letters patent, No. 41,180, granted January 5, 1864, to D. M. Smyth, a machine is described for sticking staples into [illegible]. The present invention is an improvement upon the same, and relates to a means whereby the sticking mechanism is adapted to forcing the staples into or through a pamphlet or book, and clinching the same, to hold the leaves together." An examination of the drawings of the two patents shows that they only differ in the clinching and clamping mechanism. The self-feeding action of plunger, channelled head-block, and general form of the two machines are alike. It is incredible to suppose that if Smyth, having this former patent to improve upon, had known that by simply making his channelled head-block to reciprocate slightly, and adding a small internal spring, he would have made a much better, quicker, more certain, and vastly more effective machine, that he would have resorted to the cumbersome train of lifting and elbow levers, links, longitudinally moving wedge-plate, vertically vibrating die-plate, and the gauge-screw, t, requiring constant clamping, difficult

to adjust, and liable to jam with every variation of thickness or hardness of the material to be stapled. These additions of Smyth mark his improvement over the old blind-wiring machine, and are in an opposite direction from the Heyl improvement, if it might be so considered, of the same machine. No account has been taken of the fact that the J. C. Smyth machine is a self-feeding machine, which carries it still further away. The staples are fed from behind, from a sloping table down an inclined bar, feeding the staples singly into the channel of the head-block from behind over a small spring, k, which hangs the staple up until the plunger sweeps back the spring and carries down a staple. This spring, of course, would tend to prevent the staples from being inserted singly at the open end. Besides, the staples could not be so inserted unless the space between the lower edge of the head-block, d, and the upper face of the die, m, were at least as great as the length of the largest staple, and not without much difficulty, unless the space were considerably greater. But unless this space were gained by the screw, t, which would require a screwing down and a screwing up for every staple, the wedge, s, would have to raise and lower the die, m, nearly the full distance to admit the insertion of a staple. But the sole function of the wedge, s, is to release or clamp the book or pamphlet to insure good work, and hence the motion of the the wedge, s, would have to be enormously increased over what would otherwise be required, either by increasing the length of the wedge, s, and the throw of the elbow lever, h^2, or by making the slopes of the wedge very abrupt. This increased motion of the die, m, would tend to disarrange any papers placed there for stapling, unless held securely, and as they could not be clamped by the die, m, until it had risen its whole distance, the papers would be disarranged, if laid upon a platform, and would have to be held otherwise, since the platform, if at the upper position of the die, m, would have to be also removed to give room to insert the staple. Moreover, if the staple made a close fit in the channel of the head-block

it would be still more difficult to insert (the eye not having range of the opening), while if it made a loose fit the staple would at once drop out. To push it past the spring, k (which is only adapted to admit the passage from above, in the drawing, closing snugly below), would require more force than could be given by the fingers, without difficulty, against the projecting points of the legs. Notice should also be taken of the screw, t, which in the drawing occupies a hole cut in the bench or table, showing still more conclusively the permanently attached character of the Smyth machine, which is also shown by the fact that the lifting of the lever h^1 behind is what drives the staple, and the machine, unless very securely attached to a bench or table, would be thrown off the same.

As to the J. C. Smyth machine, see testimony of Heysinger, complainant's expert, page 156, Question 10, to page 159, Question 12.

Attention is also called to the following testimony of the defendant's expert, Brown, page 49:

"x Q. 129. Does not the Heyl implement instantaneously adjust itself by the mere closing of the driving and clinching jaws to any thickness of paper or varying thicknesses of paper?

"A 129. Yes, sir.

"x Q. 130. But the Smyth machine does not thus adjust itself to the varying thicknesses of paper—that is, the machine as shown in the drawings of the Smyth Patent?

"A. 130. No; it does not.

"x Q. 131. Is not such automatic adjustability a very material advantage for miscellaneous work?

"A. 131. Yes; I think it is; but it is entirely unnecessary as a part of driving and clinching staples."

INFRINGEMENT BY THE DEFENDANT'S IMPLEMENT OF THE HEYL REISSUE.

A brief comparative analysis of the "Victor" tool, complainant's Exhibit A, will show clearly that it infringes both the first and second claims of the Heyl Patent.

This tool, in use as a staple driver and clincher, consists of a base adapted to rest upon a table or desk, and provided with a clinching recess.

Pivoted to this base is an arm which is adapted to reciprocate upon the pivot. The end of this arm is provided with a vertical slot, over the clinching recess. In said slot is presented a staple-guiding case, made to fit the same, so that the open end of the staple-guide shall come immediately over the recess on the base. This staple-guide slides or reciprocates in the slot of the guide-arm, and may be raised entirely out of the same. It is so raised or removed for the insertion of a staple in the open end. In this staple-guiding channel is contained a fitted plunger so that the staple which has been inserted in the said channel or guide, will be driven out from the latter, when the plunger is forced along the same. The upper end of the plunger bears a hand knob, a blow upon which serves to impel the plunger, and so expel the staple. Within the upper part, or enlargement of the staple guiding channel, is a coiled spring, whose function is to cause the retraction of the plunger after a staple has been driven, so as to make way for the succeeding staple.

This device is more conveniently worked in a downward direction, but it is obvious that it is capable of as efficient work if inverted.

We find, combined and operating substantially in the same way, for the same purpose, in this "Victor" tool, the elements of the first claim of the Heyl re-issue as follows: the stationary staple support or anvil, A^1, the sliding staple guide, B; the reciprocating slotted or recessed hammer operating to insert a

staple through layers of stock to be united, and simultaneously bend over its projecting ends.

And also the elements of the second claim, as follows: the staple guide, B, the anvil, A^1, spring D, and the reciprocating driver provided with the knob, G.

As to the Decree for Damages.

It was shown by the testimony taken before the Master, and so found by him, that the total number of the "Victor" tools made by the defendant was 2,150, and that the complainants made a net profit on their "Novelty" tools, which are within the first and second claims of the Heyl re issue, of $15 per gross, and the Master assessed the damages at $225.75, being at the rate of $15 per gross on the 2,150 tools made by and sold by the defendant. There was no other tool in the market or open to the public, adapted to fulfil the uses of the Heyl implement. Heysinger testified (p. 167) that the complainants had expended thousands of dollars in advertising their device, and that the same found a ready and extensive sale—390 gross (more than 56,000) thereof having been sold since the date of the Heyl re-issue. And that (p. 168, folio 249) their trade had been greatly interfered with by the Crawford ("Victor") tool, and that unless it could be stopped it would stop the complainant's business.

C. H. Hershey testified (p. 170, folio 255) that after the introduction of the "Victor" tool complainants' trade fell off and that their customers were buying and having on hand the "Victor" tool, which they obtained on better conditions than the complainants' tool.

Defendant offered no testimony to rebut these statements.